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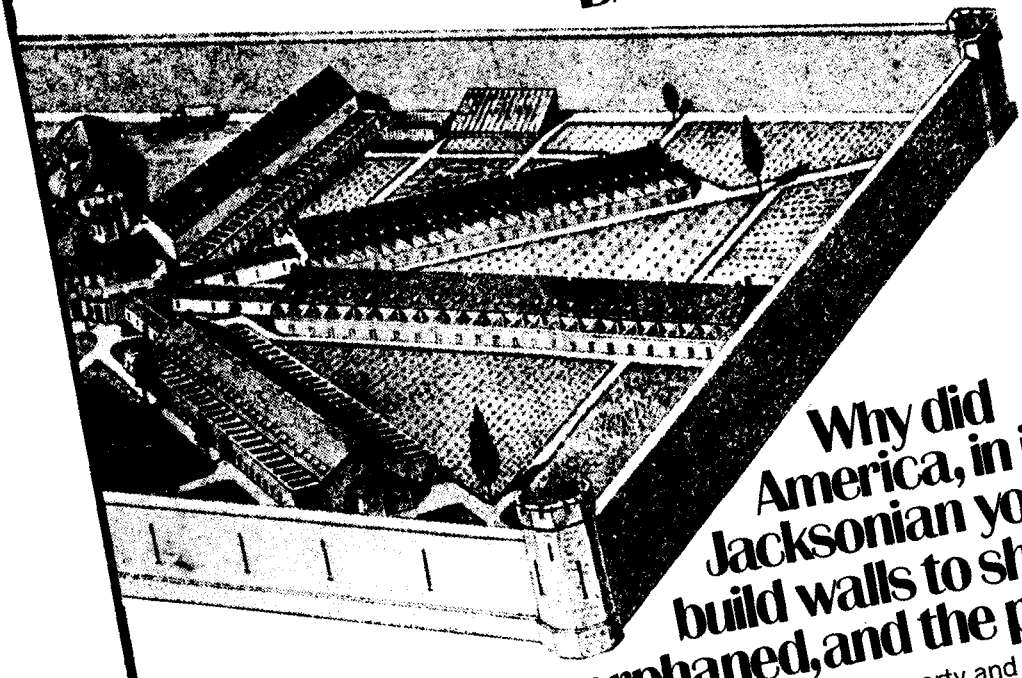

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RENÉ DUBOS

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The human adventure since the Stone Age suggests that Civilization—with a capital C—is a universal process in which all mankind is engaged; but one need not be a historian or a pessimist to know that individual civilizations are mortal. In the past, fortunately, they have generated new civilizations before disappearing. If ours is now about to die, as many scholars believe, I am ready to proclaim, "The King is dead. Long live the King."

In fact, it is reassuring to note that the word civilization was used for the first time during a period even more troubled than ours—shortly before the American and French revolutions. The Marquis de Mirabeau seems to have been the first person to use it in print in an essay entitled, "L'Amy des Hommes ou Traité de la Population," published in 1757. He used it also in an unpublished essay, "L'Amy des Femmes ou Traité de la Civilisation," in which he gave credit to women for most of the improvements that he regarded essential to civilized life. But the word civilization had for him a meaning very different from the one we give it now.

For Mirabeau, and for most of the philosophers of the Enlightenment, civilization referred to gentle ways of life, humane laws, limitations on war, a high level of purpose and conduct, in brief, all the qualities that were considered the highest expressions of mankind in the eighteenth century. As late as 1772, Samuel Johnson refused to enter the new word in his dictionary, because he felt it did not convey any concept that was not covered just as well by the older word *civility*.

Samuel Johnson would probably have felt even more justified in rejecting the word civilization if he had known that its meaning would be extended to include manifestations of human life as different as Greek rationalism and Venetian sensuality, German romanticism and English satanic mills, Jefferson's pastoralism and modern American automation.

A view of civilized life far different from that held during the eighteenth century developed with the Industrial Revolution. Throughout the nineteenth century, new technological developments brought about an immense increase in economic wealth, first in Europe, then in the United States, and progressively in other parts of the world. But the success of industrial civilization soon came to be measured almost exclusively in quantities of food and of manufactured articles produced, rather than in quality of human relationships. Until the turn of the century, there was justification in this attitude because tech-

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✪ RENÉ DUBOS' books include *Man Adapting, So Human an Animal,* for which he was awarded the Pulitzer Prize in 1969, and *Reason Awake: Science for Man.*

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nological advances did so much to make human life more comfortable, healthier, longer, and richer in experiences. But even the most optimistic person now realizes that something has gone wrong with technological civilization and that the modern ways of life do not necessarily result in better health and happiness—let alone provide the proper setting for civility.

When we speak of civilization, the word now commonly refers to what John Kenneth Galbraith designates by the telling and scornful phrase, "the affluent society." In present parlance, a society becomes civilized when it moves its outhouses indoors, heats and cools its homes with electric power obtained from a distant source, and owns more automobiles, freezers, telephones and other gadgets than it really needs. Gentle behavior, humane laws, limitations of war, a high level of purpose and conduct have been forgotten in the bargain.

Humanists, many sociologists, and not a few scientists have come to believe that scientific technology harbors a demon that is bent on destroying, if not mankind, at least the human quality of life. Jacques Ellul in *The Technological Society* and J. K. Galbraith in *The Affluent Society* and *The New Industrial State* are among the most influential social scientists whose writings suggest that technology harbors a demon that is progressively enslaving mankind. Ellul describes as a *fait accompli* the take-over of society by anonymous technological forces that operate independently of human control. Galbraith asserts that modern technological society is an almost self-contained system responsive only to the direction of an essentially autonomous "technostructure." Although the system still depends on the public, it secures acceptance of its products through an artificial demand created by advertising and by government policies.

If there is a destructive demon in technology, however, it has been put there by man himself. Or, at least, man became so enamored of the machine during the late nineteenth century that he willingly let it shape his life. Henry Adams had perceived the trend toward the subservience of man to the machine when he visited the Palais des Machines at the Paris World's Fair in 1900. As he saw the future, the biological forces that had governed human life in the past would be overpowered by steam and electricity; the cult of the dynamo would replace the cult of the Virgin. In the first installment of this column, I referred to the Chicago World's Fair of 1933 as one of the most explicit expressions of man's surrender to the technological way of life. I shall now return to this event because I regard it as having symbolic importance for the history of Western civilization.

In 1893 Chicago had a World's Fair in the classical *beaux arts* tradition, without any reference to the new industrial architecture created by H. H. Richardson in the United States, especially in Chicago; only European visitors took notice of the functional beauty of the modern tools and furniture on display. In 1933, the organizers of the World's Fair wanted to emphasize, in contrast, the role of scientific technology in the creation of wealth; they took it for granted that machines would from now on determine the shape of human life. As stated in the guidebook of the Fair:

> Science discovers, genius invents, industry applies, and *man adapts himself to, or is molded by,* new things. . . .Individuals, groups, entire races of *men fall into step* with . . . science and industry [italics mine].

A large sculptural group in the Hall of Science at the Fair was even more explicit than the guidebook in conveying the theme that machines had become more powerful than mankind. The sculpture represented a man and a woman with hands outstretched as if in fear of ignorance; between them stood a huge angular robot nearly twice their size and bending low over them with an angular metallic arm thrown reassuringly around each of them. Technology protecting and guiding mankind was indeed the theme of the 1933 Chicago Fair.

As one looks back to the evolution of the relationships between man and the machine since the nineteenth century, it becomes obvious that the dangers of technology do not come from the fact that its

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social complexities make it a Frankenstein monster independent of social control—as asserted by Ellul and Galbraith—but rather from man's acceptance that he must conform to technological imperatives instead of continuing to strive for true human values. The demon to be exorcised is not in technology, but in those men—the immense majority of us—who are more interested in things than in conditions suitable for the development of human potentialities.

Environmentalists are often accused of being softheaded and unrealistic when they advocate that technology be redirected to more sensible goals instead of being allowed to continue growing just for the sake of growth and economic prosperity. Yet this opinion is also held by eminent industrialists and technologists. When Charles Luce, board chairman of Consolidated Edison in New York, was asked in a national television program on Earth Day, 1970, how the pollution problems created by power companies could be solved, he replied: "The answer to all of these environmental and resource problems is that we simply use less goods and services. In other words, that we get off this growth kick our economy has been on throughout the history of our country."

A similar opinion is expressed by the English technologist Dennis Gabor in his recent book, *Innovations:* "Unfortunately all our drive and optimism are bound up with continuous growth; 'growth addiction' is the unwritten and unconfessed religion of our times. . . . History must stop, the insane quantitative growth must stop." The unpalatable but inescapable truth is that technology cannot long continue on its present course without ruining the quality of human life and of its environment.

In the television interview mentioned above, Charles Luce acknowledged the need for a reorientation of the technologic enterprise: "I think we can redirect our growth into better channels," said he, a view expressed even more emphatically by Dennis Gabor in the book just mentioned:

Innovation must not stop—it must take an entirely new direction. Instead of working blindly towards things bigger and better, it must work towards improving the quality of life rather than increasing its quantity. Innovation must work towards a new harmony, a new equilibrium; otherwise it will only lead to an explosion.

While it is easy to agree that the goal of technology should be to improve the quality of life rather than to increase the quantity of things, it is not easy to define what qualitative changes human beings would find desirable; this can be determined only by examining life as an experience perceived by a particular person under a particular set of circumstances. The very word desirable implies value judgments and therefore seems to remove the attempts at improving the quality of life from scientific inquiry. This subjective factor accounts, of course, for the vagueness of the phrases, "better channels," "new directions," "new harmony" and "new equilibrium," used by such intelligent persons as Charles Luce and Dennis Gabor, and also, I must acknowledge, by me on several occasions.

Granted the obviously subjective nature of taste, there exists nevertheless an objective basis for judgments of value concerning the quality of life. It is the fact that the fundamental characteristics of the human species have not changed significantly since the late Stone Age. Modern man still functions with the same equipment of genes that governed the behavior of the Paleolithic hunter and the Neolithic farmer and for this reason it is reasonable to assume that the quality of his life cannot be entirely dissociated from the unchangeable aspects of his biological nature.

More than a million years ago, the human species emerged on the plateaus of East Africa in a land of hills and valleys, with springs and streams, and a great diversity of trees, shrubs and herbs. The climate was subtropical, with alternating rainy and dry seasons, associated with growing and resting periods of vegetation. In many cases our early homes were probably rock shelters in cliffs overlooking alluvial plains.

Such pastoral landscapes with a semi-

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tropical climate evoke some of the most pleasant memories of mankind. They have inspired our image of the Biblical Paradise and most of the dominant themes of classical mythology. Countless bucolic legends and paintings depict pastures shaded by large beautiful trees under which shepherds tend grazing animals, young people engage in the games of love, and adults meditate or philosophize. Today, the landscape and climate in which the human species acquired its biological and psychological characteristics are still regarded by most people as corresponding to pleasant living conditions. Even though air conditioning and all the other types of comfort provided by modern technology enable us to create artificially the environment we desire anywhere in the world at any time, most people who can afford it will spend time on the Mediterranean Riviera or Costa Brava or in Southern California or any other country with a natural environment having some similarity to that of the cradle of Homo sapiens in East Africa.

In industrialized cities as in primitive countries, every aspect of human life is conditioned by the biological remembrance of the evolutionary past. The legend of the Golden Age is so ancient, universal and persistent precisely because it has a basis of biological truth in the environmental quality of the places where human life began, and perhaps even in the quality of primitive life itself. In the course of a recent symposium on "Man the Hunter," several anthropologists gave compelling evidence that life during the Stone Age was not as short, nasty and brutish as we had been led to believe.

To a large extent, the art of living consists in trying to recapture some of the fundamental satisfactions of human existence that have been lost through the mismanagement of civilization. Happiness may depend in part at least upon the ability to experience ancient pleasures in a modern context.

We know we cannot return to Arcadia. Yet, in our Faustian world, countless persons long for an Arcadian life, spent peacefully in a pastoral environment, unencumbered by economic preoccupations and tormenting intellectual problems. If we cannot get back to Arcadia, we can at least imagine Utopia and try to bring it into being by conscious effort. I agree with Charles Luce and Dennis Gabor that we should redirect our technological growth into better channels, and I believe that we even can use technology to realize the eighteenth-century social concepts for which Mirabeau had introduced the word, civilization.

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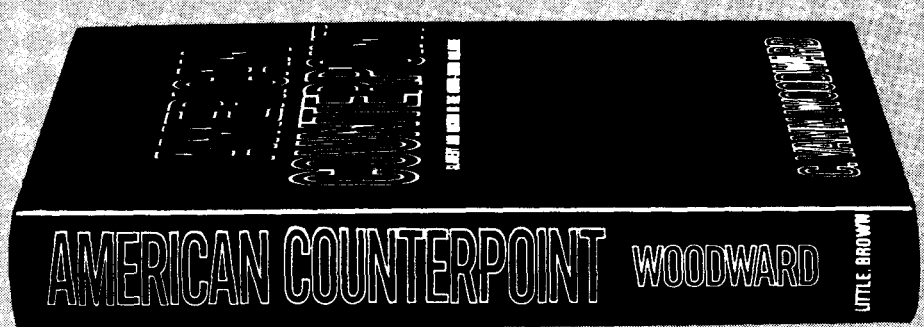

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Richard Hofstadter, 1916-1970

ALFRED KAZIN

We met in 1936—he was twenty and I twenty-one. He was sitting in the single room on Montague Street in Brooklyn Heights that was to be his first New York "apartment," and he looked marvelous, fresh as a daisy, the all-American blond collegian with crew cut just in from Buffalo with that unmistakable flat accent. He was talking with a crisp intelligence that fascinated me, and, of course, he was telling jokes, doing the impersonations that would regularly send his friends to the floor—Lou Holtz's Mr. Lapidus, the hillbilly too lazy to fish his daughter out of the well, our favorite nonhero F. D. R., a certain Polish steelworker in Buffalo, *et cetera, et cetera.* Then and afterward, for thirty-four years, he could reduce me to more helpless laughter than any professional jokesmith in American life. Then, and in all the years afterward, it was such a privilege to know him, to be in his company, to listen to him about *anything*, that the particular respect I had for his person, for his extraordinary charm and unbreakable dignity, seems to me as I write more important than anything else I can say about him.

I stress this quality of dignity, of lucid intellectual humor, of compelling self-knowledge and personal style, because—and not only in the thirties—we and our friends seemed to ourselves a particularly vulnerable, anxious, trouble-laden generation. We were in a great hurry to get out of college, to get married, to work past the many doors that seemed closed to us. We who had been born during the first World War, who came of age in the depression, whose intellectual lives were dominated by crisis, the Moscow Trials, Hitler, Stalin, the betrayal of the Spanish

✪ Richard Hofstadter, who was DeWitt Clinton Professor of History at Columbia University, served for many years as a member of the Editorial Board of The American Scholar, as has ALFRED KAZIN, author and critic, and longtime friend of Mr. Hofstadter.

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Republic, who had, in fact, never known the famous freedom of the twenties and now had to pick our way through so many lies —we were not, to put it mildly, a serenely confident or light-hearted group. Anxiety was a human condition we took for granted. And, in Dick's case, there were so many losses through death, so much uncertainty about health, so strong a habit of worry that it was just the resonant tone of dignity, the firmly logical mind even at twenty, that fascinated me. They fascinated me the last day I ever saw him, when from his hospital bed, with the manuscript of his last, unfinished book at his side, he talked brilliantly about the relation of the youth rebellion to the decline of religious ideas in America.

Dick had very early, it seems to me, learned the meaning of Yeats's saying that we begin to live when we have conceived life as tragedy. He had in some way, and very early, mastered the art of survival as the discipline of thought; he knew what he knew, he knew what he needed, and he had learned to think his way through many difficulties with that awareness of human limitations that is the grace—and delight—of historians forever studying the public stage. Despite his natural pessimism, his sometimes comically self-parodying depths of melancholy, he had somehow taught himself to retrieve his life, to honor the occasion that is life, to enjoy his existence despite so many rocks, shoals and bloody-minded totalitarians. And it was this *achieved* strength that made him so lovable and admirable to his friends, not least to his loving and admiring wife Beatrice—he was, among other distinctions, the most cherished of husbands. There was a rigor of mind, a dutifulness to the moral obligations of being a man, that not merely saved him again and again, but became so dependable a fixture of his historical thinking that when *we* became middle-aged and the Establishment, young people who would not listen to anyone else found it—yes, fascinating to listen to him.

I worry that those who did not know him, who merely read him, may remain as ignorant of his real self as was the lamentable New York *Times* obituary. Despite his many early fears, Dick established himself so quickly, went on so brilliantly in his writ-

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ing and in his professional advancement at Columbia, that for many students and readers the extraordinarily funny and touching person may have been concealed in the professional historian. But knowing him as I did, it often amused me to see his natural wit and irreverence in his work. Historians, American historians perhaps especially, often sound as grave as judges; "history" can certainly become a thing apart. But it was typical of Dick to write in *The American Political Tradition* that F.D.R. "could say 'my old friend' in eleven languages" and that he had an "irresistible footnote" to his account of Roosevelt's "sudden espousal of a reform he had opposed." Methods and methodology in the study of American history—which is no more of a science than is literary criticism—have always seemed to me less significant to the making of a good historian than point of view. And the special pleasure I always took in reading Dick was in his polemics, his gift for criticism, his intellectual irony, his passion for giveaway quotations, his marshaling of historical argument as a form of literature. He cared as much about literature as any writer I have known, knew it intimately and lovingly, and he responded to other people's writing with the same feeling for literary effect that he sought in his own.

But beyond the historian's natural belief in literature, Dick also had a writer's characteristic irony about power. Although his main interest was, of course, political society in America, he remained detached from the powerful and influential in politics. He was fascinated by leaders, leadership, intellectual elites; his approach to history, at least in his earliest books, was with ideas and administration in history rather than with social history. Up to the end, when he embarked on the three-volume narrative history that is tragically unfinished, he was as a historian more interested in interpretation than in "straight" history—for which he also had a real gift that he was eager to display. Yet, although he saw leaders and ideas as the engines of history, Dick was singularly unconcerned to meet the powerful, much less to "influence" them. I am sure that he never saw much, if anything, of the American presidents who dominated our generation—or of political leaders generally. His skepti-

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cism about power, his fear of power, was natural to "our group" —people who kept up some habit of alienation long after they had ceased to be radicals and had, in fact, become quite happily institutionalized. (Dick had a passion for Columbia, could not be dragged elsewhere, and often talked to me, as cleverly as a novelist, about Columbia as a "society.") Yet he remained detached, an outsider, an intellectual, a historian who never deluded himself that politicians in the flesh had much to teach him—or vice versa. He had a very irreverent mind as well as a closely analytical one, and I am afraid that he never quite lost some unconquerable sense of the absurdity of politics and the inconsistency of politicians. Shocking as it may seem to a later generation that takes the New Deal for granted, he could never in his younger days overcome the feeling that F. D. R. was intellectually threadbare. In his later writings he modified early doubts about the New Deal. But he did tend to see politicians first of all as minds, which is why he was never an indiscriminate admirer of any and all Kennedys. In private, at least, he could reach the heights of unprintable profanation in discussing such wearying notables as John Foster Dulles.

This fear of power, this disinclination to mix in the affairs of power, this skepticism about power were part of his old-fashioned concern for intellectual detachment, honor, and the demands of historical scholarship; Dick was no "pragmatist." Yet this rigor went hand in hand with his passion for American history itself—which is certainly not altogether a history of intellectuals. After writing so many brilliant works in American history, he once said to me that he was more fascinated by American history than ever. He was becoming a storyteller, going over and over the same material for the pleasure of composing and recomposing the history of the American experience. This experience was his life, his intellectual passion. Although he was at different times tempted by new methods and insights in the social sciences, he never pretended to total unreal "objectivity"; he had too passionate a concern with the moral issues and human texture of American history. Far from seeking those illusory laws of history that he had rejected with the dogmas of the thir-

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ties, he was more and more caught up in the excitement of writing narrative history. This was to crown his life. In the last agonizing year, when he worked with his dying breath, worked with a courage and determination for which there are simply no words, he was able to finish enough of the first volume, on America in 1750, and this will be published. So, in the end, although his last year was the purest overcoming of the individual will by the cruelty of nature, the sheer determination of his spirit, of the human fight against death, at least has this proper—and happy—result. Nothing could be more true to the spirit of his life, to the firmness that guided him through so many disasters.

But of the void and ache that he leaves in our lives, there is nothing one can say that will ever make up for his absence, that can even suggest the pain of his absence. He was so important a part of my life that it will always be natural to look for his face, to expect his voice.

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Antarctica: The World's Greatest Laboratory

LAURENCE M. GOULD

FOR SHEER UTTER MAGNIFICENT DESOLATION Antarctica has no counterpart on earth. Inhospitable, grim and dangerous, it is starkly beautiful beyond description. It is a photographer's paradise and is still the least known major feature of our planet earth.

That observation is a reflection of my fifth trip to Antarctica during the austral spring of 1969, but I might well have written the same words concerning my first exposure to Antarctica as senior scientist and second-in-command of the first Byrd Antarctic expedition (1928-30). Even with the enormous amount of new information we have gleaned in the past forty years Antarctica is still the last great frontier on earth.

Antarctica includes more than one quarter of all the landmasses south of the equator. It is about the size of the United States and Europe combined. It is thus the fifth continent in size, but was the seventh to be discovered.

Antarctica is unique in many ways. First of all, it is the only continent that has never been the home of man. Our geological evidence tells us that the continent has been covered with ice for millions of years, which has made it totally uninhabitable for man.

Antarctica is the most isolated of all continents. The rest are closely related. Indeed, one could start at Cape Horn and travel

✪ President Emeritus of Carleton College and now professor of geology at the University of Arizona, LAURENCE M. GOULD has a record of more than forty years' experience of exploration and research in Antarctica. He was second-in-command of the first Byrd Antarctic Expedition, 1928-30, and director of the United States Antarctic Program for the International Geophysical Year, 1957-58, and continues his activities now as chairman of the Committee on Polar Research of the National Academy of Sciences and chairman of the Advisory Panel on Polar Programs for the National Science Foundation.

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to every other continental landmass on earth without crossing more than sixty miles of shallow seas. On the other hand, Antarctica is totally surrounded by oceanic waters. Here the Indian, Atlantic and the Pacific merge as a great common ocean, sometimes referred to as the "Antarctic Ocean," which has an area six times that of the continent itself. South America, the nearest continent, is more than seven hundred miles away and separated from Antarctica by the deep, stormy, dangerous seas of Drake Passage. Africa and Australia lie nearly two thousand miles away.

With its shining coat of ice, Antarctica is the highest of all of the continents with an average altitude of more than one mile above sea level. It is the world's greatest desert. It is the most nearly lifeless; it is the coldest and the driest of all of the continents. Precipitation is in the form of snow. In annual rainfall equivalent, for the continent as a whole, it is between four and six inches, but the amount that falls on top of the high interior plateau is less than two inches. Antarctica is indeed "The Sahara of Snow."

Antarctica is always cold but there are great variations in temperature, which reflect differences in altitude. The variation between the high interior plateau of East Antarctica and the coastal regions on the Indian Ocean is as great as that between Tucson and Minneapolis.

On May 7, 1957, the minimum temperature at the South Pole was −100°F., while Little America, less than eight hundred miles away at sea level, had a low of +30°F. The mean temperatures of the warmest months in the coastal areas are around 32°F., while in the interior they vary from −4°F. to −32°F. For the coldest months the mean temperatures vary from −4°F. to −22°F. on the coast and from −40°F. to −95°F. on the high plateau. The coldest temperature recorded at the South Pole is −112°F. Higher up on the plateau is the coldest place on earth, the Russian base of Vostok, which has recorded a temperature of −126.9°F.

In addition to the inherent low temperatures of Antarctica, it is the windiest continent on earth. It merits the designation, "the home of the blizzard," given to it many years ago by the great Australian explorer, Sir Douglas Mawson. It is the "wind chill" that shows the real impact of Antarctic temperatures on man. Thus with

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a wind of twenty miles per hour and a temperature of −20°F. the effect on man is equivalent to a temperature of −67°F. without the wind.

In addition to being the highest, the coldest and most nearly lifeless, Antarctica is the only continent that changes its size with the seasons. In summer the area is about five and a half million square miles. During the winter the sea freezes over northward for several hundred miles to double the size of the continent. It must be remembered that ice is a perfectly good rock. It just happens to melt at the absurdly low temperature of 32°F., while most rocks melt at temperatures measured in thousands of degrees.

This varying-sized halo of ice surrounding Antarctica is of great significance, for it is the greatest single regular or recurring factor in world weather and climate.

Antarctica again is unique in the influence it exerts over the surrounding oceans. No other continent on earth so profoundly affects its ocean environment.

The real effective boundary of Antarctic influence is not the coastline of the continent itself but the Antarctic Convergence, which is a fairly well-defined zone between 48° and 60° south latitude. This is where the colder waters flowing northward from Antarctica mix with the southward moving warmer waters from the north. The Antarctic Convergence marks a definite physical and biological zone in the oceans. Studies made principally by the National Science Laboratory ship, *Eltanin,* suggest that these Antarctic waters are the ultimate source not only of major ocean currents, but of a major part of ocean life as well.

The modern age of Antarctic exploration and research had its inception with the introduction of aircraft. Although the first flight in Antarctica was made by Sir Hubert Wilkins on December 20, 1928, it was Commander, later Rear Admiral, Richard E. Byrd to whom credit belongs for bringing the air age to Antarctica. He was the dominant figure in Antarctic exploration for nearly three decades.

The first Byrd Antarctic expedition of 1928-30 introduced most of the techniques of travel and communication that have made

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possible the greatly extended study of Antarctica that obtained in the International Geophysical Year, 1957-58, and the succeeding programs in which we are now involved. Today aircraft are immeasurably more flexible and efficient than then; oversnow vehicles really work and radios perform better. In all of the logistic changes that have taken place in the history of Antarctic exploration in this century, aircraft has been a dominant and increasingly important factor.

The exploration of Antarctica played an important role in the International Geophysical Year, which has been aptly characterized by Hugh Odishaw, executive director of the United States National Committee of the I.G.Y., as "the greatest peacetime activity in man's history."

When a special committee of the International Council of Scientific Unions (I.C.S.U.) met in Rome in 1954 to consider national programs of the I.G.Y., it singled out two areas for special attention—outer space and Antarctica, observing that the latter is "a region of almost unparalleled interest in the fields of geophysics and geography alike." Significant results were achieved in both areas, and it is a matter of record that the scientific uncovering of Antarctica was second only to the space satellite program among the achievements of the International Geophysical Year. From the very beginning of the I.G.Y., differences melted away and the willingness to adjust national programs for common goals prevailed. There was a flexibility and simplicity and a freedom from political considerations without precedent in international scientific cooperation. When all matters were ironed out, the Antarctic program emerged as the combined efforts of twelve nations—Argentina, France, Australia, Belgium, Chile, Japan, New Zealand, Norway, South Africa, the United Kingdom, the United States and Soviet Russia—with a total of forty-eight new stations on the margins and in the interior of the Antarctic continent, in addition to seven stations already established in the Antarctic Peninsula by Argentina, Chile and the United Kingdom.

The planet earth in its entirety is the geophysicist's laboratory; nature performs the experiments and man makes the observations. The International Geophysical Year consisted of those programs

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that were inherently global in character. For Antarctica there were eleven programs—aurora, cosmic rays, geomagnetism, glaciology, gravity, ionospheric physics, meteorology, oceanography, seismology, biology and medicine. Impressive records were made in all of these fields, in addition to the further geographic exploration of the continent, which resulted in the discovery of the last unknown major physical features of it.

Early in the I.G.Y. a program for the exchange of scientists was begun whereby researchers of one country joined in the programs of others. This made possible the free and prolonged exchange of scientific information, which has continued with increasing scope during the years since the I.G.Y.

Even before the I.G.Y. was well under way it was evident that it would take more than one year, even of eighteen months in length, to uncover the major secrets of Antarctica. The I.C.S.U., therefore, created a permanent committee to continue the scientific cooperation of the I.G.Y. It was formed in February, 1958, and designated the Special Committee on Antarctic Research (SCAR). Later the word Scientific was substituted for Special. With the ending of the I.G.Y. and the assumption of responsibility for international coordination of scientific programs by SCAR, the scientific programs were enlarged. Cartography, geology and geodesy, and a greatly expanded program in biology were added to the disciplines that had characterized the I.G.Y.

Current Trends in Antarctic Research

The basic work of exploring and describing Antarctica and its climatic and oceanic environment, which began with the I.G.Y., is giving way to more detailed investigations of the geophysical and biological phenomena.

Of the twelve SCAR nations, all but Norway and Belgium still maintain stations in the Antarctic and the subantarctic. But scientists from both Norway and Belgium continue to participate in Antarctic research through the logistic support of the United States and some other SCAR nations.

Naturally, the major scientific activities are carried out in the austral summer, during which the total population of the con-

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tinent is from twenty-five hundred to three thousand. This dwindles to about six hundred during the austral winter.

Currently, only the Soviet Union and the United States maintain year-round stations inland. The permanent U.S. stations are McMurdo (the logistic focus for all activity on the continent except that of Palmer Station on the Antarctic Peninsula), Palmer, Byrd, and the Amundsen-Scott South Pole Station. During the I.G.Y. and through 1963, the United States and New Zealand jointly operated Hallett as a year-round station. Since 1964 it has been operated only as a summer station. In addition to the programs conducted at these stations, there are extended operations at temporary stations and many remote field sites during the summer.

The operation of the United States Antarctic Research Program (USARP) is under the auspices of the National Science Foundation through its Office of Polar Programs. The Committee of Polar Research of the National Academy of Sciences assists in an advisory capacity in the planning of scientific programs. Each austral spring some two hundred U.S. scientists and technicians fly to Antarctica for summer research programs. They come from more than fifty universities and colleges, industrial firms and governmental agencies. During the winter the population of scientists and technicians shrinks to about thirty.

From the very beginning of the I.G.Y., the United States Navy, through its support force known as "Operation Deep Freeze," has provided the logistic support for the scientific effort. This has been one of the most productive partnerships I know of. It would be very difficult, indeed, to exaggerate the debt we Antarctic scientists owe the Navy.

Science in Antarctica

The International Geophysical Year and the continuing scientific programs have shed new and definitive light on both geophysical and biological phenomena of great significance to the rest of the world.

To the scientist all knowledge is relevant, but support for pure science is increasingly difficult to secure. Happily for those who labor in Antarctica, scientific information from that continent

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and its surrounding oceans is of such wide and important application to many of the major problems facing mankind as to challenge even the most pragmatic approach to the validity of our United States Antarctic Research Program.

Population pressure and pollution increasing at an alarming rate have focused attention on the necessity of giving high priority to man's relationship to his deteriorating environment. At long last there is wide awareness that all of the earth's resources are finite and that pollution is a global problem. We must take a total overview of planet earth to understand and appraise the magnitude of the problems that we face.

Scientific data from Antarctica have added necessary pieces to the jigsaw puzzle of climatic, atmospheric and oceanographic processes, all of which are so necessary to an understanding of man's environment. Even such an unexpected subject as seismology, which is the study of earthquakes, receives unique insights that can come only from Antarctica, for it is the only continent that is free of earthquakes.

A press release by the National Science Foundation on September 27, 1970, for the austral scientific programs carried this headline: "SCIENTISTS TO STUDY POLLUTION PROBLEM AS PART OF U. S. ANTARCTIC RESEARCH PROGRAM."

Who would have thought, even a decade ago, that the DDT sprayed on the cotton fields in Arizona would find its way to Antarctica? But it has, and its residues are found in penguins, seals and other animals of Antarctica. And who would have supposed that the exhaust from the automobiles of Los Angeles would pollute the last continent unspoiled by man? But it has.

The atmosphere, as well as the ocean, is a closed system, and although much of the pollution released by man settles back to earth near its origin, some always gets involved in the atmospheric and oceanic systems and becomes worldwide in distribution.

Several years ago traces of lead were found in the Greenland Ice Sheet by Claire Patterson, a geochemist from the California Institute of Technology. (Samples are collected from pits dug in the snow and the annual layers of accumulation counted to give precise dates.) The amount showed a fourfold increase with the

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widespread use of lead smelters in the Industrial Revolution. In 1940, with the advent of lead additives in gasoline, the amount tripled, "indicating an alarming increase."

Traces of lead have since been found in Antarctica but in lesser amounts, which is to be expected for two reasons. Major atmospheric circulation is largely confined to separate hemispheres and ninety percent of the world population is in the northern hemisphere. Not only lead and DDT but aerosols, carbon dioxide and other products of the industrial age, all measurable to some degree, are found in the Antarctic ice cap. Isotopes and C^{14} enable the glaciologist to determine the ages of the successive layers of snow and ice. Antarctic scientists are now sampling the Antarctic atmosphere not only for traces of lead but of copper, iron, aluminum and other metals.

Pollutants that fall on the land are largely lost. Those that fall in the sea are geochemically altered as they sink into the depths of the oceans. But the two great ice sheets—and particularly Antarctica, where the temperature on the high plateau never rises to melting—are great reservoirs or storehouses of geochemical information, for the material that is of either cosmic or man-made origin remains unchanged as it becomes buried in accumulating layers of snow. Here alone on planet earth we have a complete record of both man-made and cosmic pollutants.

Dr. Morton J. Rubin, a foremost authority on Antarctic meteorology, has recently observed: "It is now time to establish stations to measure all aspects of this contamination in order to provide a base line against which to compare future conditions."

The ice gives us information about many other matters of great scientific interest besides pollution. Modern man has been able to develop techniques that enable him to drill holes through the ice sheet and preserve the ice core. One such core has been drilled more than seven thousand feet through the ice at Byrd Station. Of course, it not only records the pollutants but also gives us a record of past climates.

The ice core is the greatest tool yet found for the study of ancient climates; it provides information for a greater period of time than can be found elsewhere on earth. The single core from

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Byrd Station takes us back over a thousand centuries of climatic history. Obviously the study of ice cores has a spectacular future. It is now just in its infancy. As more cores become available, they will provide us, by their record of past climatic cycles, the best guides for predicting future climatic changes. But they also have an important bearing on many other scientific disciplines, such as glaciology, hydrology, geochronology, atmospheric chemistry, rheology and physical dynamics.

The great inland ice sheet has still further scientific and practical interest for us. It is, of course, the most distinctive feature of Antarctica, for it not only covers almost all of the land but in places extends in the form of permanent floating ice shelves for hundreds of miles over the sea.

The average thickness of the ice is about seven thousand feet and the maximum depth yet found is sixteen thousand five hundred feet. The volume of the ice is more than eight million cubic miles. Antarctica contains at least ninety percent of the world's ice, which means most of it is fresh water and nearly two percent of the total water budget of the earth. Its role in the hydrological cycle is obviously very important.

Of great importance, too, is the stability of the inland ice sheet, for it is the most important single factor governing sea levels. The removal of but a few feet of surface ice as melt water would seriously raise sea levels, and if all the ice were to melt, the sea levels would rise from two hundred to three hundred feet, with disastrous results to all seaports and low-lying seacoasts. It is, therefore, of fundamental importance to discover the present degree of stability of the Antarctic ice cap. Most recent information suggests that the ice cover is increasing and that, for the time being, we are heading toward a colder climatic phase.

The Land

While less than five percent of the bedrock that supports the inland ice is exposed, these exposures have yielded information shedding light on the whole, worldwide question of the origin and evolution of continents and ocean basins. They have not, however, revealed any deposits of commercial importance. With

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such limited exposures of rock this is not surprising, but, remembering that Antarctica is a major continent and that every other continent on earth does have or has had important mineral deposits, one should be careful about predicting the future of Antarctica in economic geology. To be sure, it does have enormous known coal deposits, greater than those of any other continent.

Gondwanaland

One of the most intriguing problems in the long history of geology has been the relationship of continents and ocean basins. The idea that the continents were all connected in an earlier geological time is a very old one, but it was first suggested in 1885 by an Austrian geologist, Eduard Suess, who proposed the existence of a giant mass, which he called Gondwanaland. The idea, however, was further clarified by a German meteorologist, Alfred Wegener, in 1915. In amassing evidence for this thesis, he cited Antarctica nineteen times, although, of course, little was known of the continent at that time. Being unable to document his thesis with fossils and other evidence acceptable to geologists, he received little backing for his proposal.

Evidence for Wegener's thesis received significant support with the publication of *Our Wandering Continents* by Alexander Du Toit, a South African geologist, in 1937. He showed that if there had been a single southern great landmass, Antarctica was its keystone.

A great variety of evidence, beginning with the discovery of the fossil remains of the fernlike plant Glossopteris early in the century, has been accumulating over the succeeding years. Invertebrate fossils, rock types and structures and ancient glacial deposits, found in Antarctica, had their counterparts in the now widely separated southern continents and India. There was no adequate explanation for these relationships except that the southern lands were once one. Yet there remained many skeptics.

This skepticism began to fade with the first fossil vertebrate discovery in 1967—that of an amphibian known as a labyrinthodont. Then on November 23, 1969, the bones of a Triassic reptile known as a thecodont were discovered in the Transantarctic

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Mountains about four hundred miles from the South Pole.

But labyrinthodonts and thecodonts are general terms for a variety of reptiles. On December 4, 1969, a further search in the same area turned up among fossils the jawbone of a creature that Dr. Edwin H. Colbert (noted vertebrate paleontologist, and a member of the Ohio State University team headed by Dr. David Elliot) identified as Lystrosaurus. This was the first fossil vertebrate from Antarctica identified as to specific genus. More than that, it is a fossil that literally dates a continent. If one had gone to Antarctica to find a specific fossil, this would have been it. It is the keystone of the mounting evidence for the reality of Gondwanaland.

The Lystrosaurus was a small freshwater reptile that lived some two hundred million years ago and whose fossil remains have also been found in abundance in Africa and other southern landmasses. It could not possibly have negotiated the wide seas that now separate these southern lands. No further proof was needed for the existence of Gondwanaland.

Antarctic Life

Research in biology is no less rewarding than that in the geophysical sciences. Antarctica is the best model on earth for analyzing extraterrestrial environment, and it further provides the optimum place to study man's adaptation to earth's most unfriendly environment.

The harshest environmental conditions under which life survives on planet earth are to be found on the limited areas of rock exposures on the continent. Terrestrial life is possible only because of the microhabitats. While air temperatures may remain very low, rock temperatures on which the sun may have been shining literally for months may achieve temperatures of 70° to 90°. A thin layer of warm air forms above such rocks, if it is not displaced by the wind. Here in this warm, thin microclimate, which may be as warm as a summer day in mid-latitudes, Antarctica's animal life, which consists of a few species of primitive insects, survives on the continent's only plant life—lichens and mosses.

Although the Antarctic continent is known for its sparsity of life, the universal ocean that surrounds the continent is noted for

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its great abundance. The richness of life is traceable to the abundance of nitrates and phosphates, which are constantly welling up to the surface within the Antarctic Convergence. Beginning with an unbelievable quantity of phytoplankton, there is a relatively simple chain of life producing such an abundance of animals that, acre for acre, the waters of these oceans along coastal and inshore regions are potentially richer food-producing areas than any others on the globe.

Although the number of species is not great, the amount of life is enormous. The productivity of this region is reflected by the presence of the blue whale, the largest creature that has ever lived. His food capacity is one ton per day of a shrimp-like creature, krill, and he is five times as heavy as brontosaur, which was the greatest animal that ever walked the earth.

This vast protein-rich region may, after due research, become a major source of food for a hungry world. For no matter how far man proceeds in his reaches into space, his continued survival and welfare will depend upon the resources of his mother planet earth. Antarctica may in time repay many times over in food productivity the cost of the continuing research efforts being made there. Here the role of applied science is bound to increase enormously.

Marine biology has become one of the major programs in USARP, for, to the biologist, animals of the Antarctic seas are among the most distinctive and interesting on earth. Furthermore, the stable ice platform of McMurdo Sound eliminates the need for ship and other expensive equipment.

Of special interest to the biochemist are the Trematomus fishes, which reach their maximum swimming activity at the lowest temperature of their natural environment of $-2°C$. This remarkable fish has a built-in "antifreeze" of a glycoprotein, which somehow interacts with water to prevent him from freezing.

Of the larger vertebrates the Weddell seal is a laboratory in himself. No species lives at higher latitudes or exists under more severe conditions. Not only is he adapted to an undersea ice environment during the polar winter, but he can dive to depths of nearly two thousand feet and stay submerged for more than forty minutes.

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The Continent of Peace

Early in the International Geophysical Year there was a strong feeling that the highly successful scientific cooperation that characterized that enterprise should be protected in some permanent form. This led to the calling of a meeting by President Eisenhower in Washington on May 3, 1958. The outcome of this and successive meetings was the Antarctic Treaty, which is a political document without precedent in human history. Here is the first treaty ever designed to protect a scientific program. This political instrument was left to the nongovernment agency SCAR for coordination of the cooperative scientific programs.

The words of the treaty are prose poetry. Its spirit is revealed in the preamble: "Recognizing that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of an international discord; . . .

"Convinced that the establishment of a firm foundation for the continuation and development of such cooperation on the basis of freedom of scientific investigations in Antarctica as applied during the International Geophysical Year accords with the interest of science and the progress of mankind; . . ." Other clauses continue in this vein.

In his analysis of the treaty, Dr. Herman Plegger of the Department of State, who led the United States delegations, said: "This Treaty for the first time in history devotes a large part of the world to peaceful purposes. It is the first Treaty which prohibits nuclear explosions with adequate protection. It is the first Treaty to provide freedom of scientific investigation over large areas, and it constitutes a precedent in the field of disarmament, the prohibition of nuclear explosions and the law of space."

My fifth trip to Antarctica derived from my responsibilities as chairman of the Committee on Polar Research of the National Academy of Sciences and chairman of the Advisory Panel on Polar Programs for the National Science Foundation. The austral spring and early summer seemed a good time for my inspection trip, for it was the fortieth anniversary of the first Byrd Antarctic Expedi-

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tion. On November 29, 1969, I flew to the South Pole, where I placed a wreath memorializing the fortieth anniversary of the flight by Commander Byrd and his three companions, Bernt Balchen, Harold June and Ashley McKinley.

Speaking for men of the Navy and the scientific community present, I said: "The wreath I now place at the South Pole is a symbol of our enduring gratitude to Admiral Byrd and his colleagues who led the way forty years ago."

The trip enabled me to be on the Antarctic continent to observe the tenth anniversary of the signing of the Antarctic Treaty (December 1, 1959). On the eve of this event, we had a simple ceremony about the statue of Admiral Byrd at McMurdo Station. The next day a simple but more elaborate ceremony was held at Scott Station—the New Zealand base. Here representatives of the SCAR nations gathered, with the flags of the sixteen signatories of the Antarctic Treaty flying over the base. Brief speeches were given by all of us. It seems to me even now that the Soviet representative was one of the most eloquent, in calling our attention to the great hope for peace symbolized by the highly successful scientific cooperation in Antarctica and the resulting Antarctic Treaty.

The New York *Times* observed the tenth anniversary of the signing of the Antarctic Treaty in a moving editorial on December 9, 1969, from which the following words are taken:

> There can be little doubt that this precedent helped to create the foundations of mutual confidence on which the great diplomatic landmarks of the past decade have been based, notably the test ban treaty of 1963, the space compact of 1967, and the nuclear nonproliferation pact of 1968. In effect, Antarctica has become a political science laboratory, and the Antarctic Treaty a historic, successful experiment pointing the way for future progress toward international cooperation.
>
> Now the task is to apply the lessons learned from that experiment to all of the great contemporary problems where needless suspicion and rivalry waste huge resources and endanger earth itself.

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After a Flight

EUGENIO MONTALE

1

The birch trees were there, thick, to hide
the clinic where a young woman, ill
from loving life too much, hung in the balance
between all and nothingness, bored.
A cricket was singing, fitting
perfectly with the amenities of the place,
in unison with the cuckoo that you had heard
in Indonesia, at a smaller cost.
The birch trees were there; also a Swiss nurse,
three or four half-wits in the courtyard,
a picture book of exotic birds on the table,
the telephone, and a few chocolates.
I too was there, of course, with a bunch
of other bores trying to cheer you up, though it was clear
that it was you who would lavish comfort on us
if only we could use our eyes. I could.

2

Your step is not sacerdotal,
you did not learn it abroad, at the school
of Jacques Dalcroze—more affectation than ritual.
Yours came from Oceania, with a few
fish bones stuck in your heel. Anxious
relatives, doctors, interns rushed
to your bedside, unaware that those coral reefs
are not Le Focette,[1] but the foam
of the hereafter, the exit from the here-and-now.
Three fish bones in your foot, not three
shark fins, comestible. Then an artificial
sleep came to envelop you.

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Later only murmurs by telephone reached me
after a long area code and complaints from interfering parties. Nothing else from the wire, not even the muted sound of steps on a thick carpet. The sleep of an aquarium.

3

The American Indians—if you,
snatched away by a whirlwind, had arrived down there
in the green ganglia within which more and more
they allow themselves to be entangled
to escape from the white man—
those celestial ones would have adorned you
with garlands of noise-making offerings, though your eyes
are not long and slanted like a Mongol's.
Long was their flight, surely over
many generations. Yours, a short one,
has saved you from the darkness or the claw
that held you hostage. And now the telephone
is no longer necessary to hear you.

4

My road has wound its way
among demons and gods. Impossible
to distinguish between them. It was all an exchange
of masks, of beards—a Volapük, a Guaraní, a pungent
gibberish that no one could understand.
Now do not ask why I have singled you out
nor with what face and what sound you have entered
my head, deafened by too many automobile horns.
Some tie or loop has reached me
and clearly you know nothing of it.
At our first encounter your brain appeared
as in a vapor, and mine was no better.
You threw a glass out of the window,
then a shoe, and yourself too—almost—
had I not been close by, watching.
But you know nothing about it, and whether it was a dream, a noose, or a trap, it is pointless to ask now.

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Surely your road also
was straddling hell, and it was like
saying good-bye to an uninhabitable Elysium.

5

While I am thinking of you the pages of the calendar
come off rapidly one after the other. Bad
weather this morning, and time
even more noxious. The best of you
erupted among mastic trees, briars, brooks,
croaking of frogs, short flights of wading birds
unknown to me (Knights-
of-Italy, you called them!), and I was sleeping,
though sleepless, amid the mold of my books and notes.
The very worst in me erupted also: the desire
to reascend the years, to defeat
swift-footed Chronos with a thousand ruses.
They say I believe in nothing, except miracles.
I do not know what you believe in, yourself perhaps,
or whether you let others see and create you.
But this is only human after all, the privilege
of those who hold up the world without knowing it.

6

When we reached the village of the Nazi massacre,
Sant'Anna, over which a sheer peak hangs,
I saw you climbing like a mountain goat
to the very top, beside a slim Polish girl
and a water rat—your guide, the best ibex of all.
I stood still for five hours in the square
counting the names of the dead engraved on the monument
and ridiculously putting myself among them *honoris causa.*
In the evening a throbbing outboard
jolted us through the Burlamacca,[2]
a filthy canal into which a pseudo oil factory
discharges boiling water. Perhaps this was
the dress rehearsal for hell. Burlamacchi, Caponsacchi . . .[3]
specters of heresies, of illegible poems.

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Poetry and sewers, two problems
never unrelated (but I did not mention it then).

7

Slow at neologisms,
in my semiwakefulness I was in doubt at first
between Hovercraft and Hydrofoil,
unsure about the name to give the winged creature
on which I intended to carry you off
furtively; and meantime you had run away
with a sleek water rat who was
faster than I, and alas so much younger. Slowly I wandered
throughout the entire long day, reflecting
that no such thoughts had ever passed
between King Lear and Cordelia
and that any comparison however remote collapsed.
On my way back, I stopped to visit
ancient tombs of Etruscan chiefs, lairs of aristocrats
disguised as thieves, the prisonlike streets
à la Piranesi of old Leghorn.
I made my way through mazes of junk.[4] The sky,
stupendous, loomed almost frighteningly on that return.
Even the link with the tragic drama had now gone up in smoke,
for, to top it all, I am not even your father.

8

I cannot breathe when you are away—
thus wrote Keats to Fanny Brawne,
whom he plucked from obscurity. Strange that my case,
if I may be permitted, should be different. I am able
to breathe much better if you go away.
Propinquity brings back events
to remember, but not as they happened,
as I foresaw them as future
smelling salts, if necessary, or medicated
vinegar (nowadays, however, no one faints
over such trifles, a broken heart, and the like).
It is on the mass of facts that the impact falls

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but the scaffolding does not hold when you are
present, like a cadaver. I shall not
attempt to tell you about it. I know that if you read me
you think you have given me the spark
I needed, and that everything else—except
silence—matters little.

9

"Pirópo," to conclude.[5]

Marvelous, your arms. When
I die come and embrace me, but
without your sweater.

Translated by LUCIANO REBAY

TRANSLATOR'S NOTE: This is one of Montale's most recent poems (1969), now included in his latest book of verse, *Satura* (1971). The following brief notes to the text were prepared with the poet's assistance.

1. One of the four districts of Marina di Pietrasanta, the popular Tyrrhenian resort near Viareggio.
2. The canal between Lake Massaciuccoli and Viareggio.
3. Burlamacchi: the name given a group of Protestant heretics from the Burlamacca area in the seventeenth century. [Giuseppe] Caponsacchi: one of the main characters in Robert Browning's long verse novel, *The Ring and the Book*—a priest who elopes with a married woman.
4. A reference to the Leghorn flea market.
5. Montale has omitted this concluding part of the poem in the text published in *Satura*. It appears here with his consent.

✪ EUGENIO MONTALE, one of the major European poets of this century, was born in Genoa in 1896. His poetic work is collected in four books: *Ossi di seppia* (*Cuttlefish Bones*, 1925), *Le occasioni* (*Occasions*, 1939), *La bufera e altro* (*The Storm and Other Poems*, 1956), and *Satura* (1971). In 1967 the Italian government made him a senator for life in recognition of his literary and artistic achievements. LUCIANO REBAY is professor of Italian and chairman of the Italian department at Columbia University. He has written extensively on Italian poetry and contemporary Italian literature and is currently working on a book on Montale.

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A Vision of Environment

PETER L. MARKS

MOST OF THE INCREASINGLY FREQUENT ARTICLES, speeches and news broadcasts about our innumerable environmental crises can be considered negative in the sense that they focus attention on what we are doing that is wrong or harmful from an environmental point of view. Their major concern is with cleaning up or preventing further degradation of lakes, rivers, oceans, the atmosphere, and so on. While obviously laudable and desirable as a necessary first step, such efforts ignore a fundamental aspect of environmental rehabilitation: the need for some understanding of what constitutes the ideal environment toward which we are ultimately striving. Characterization of an idealized environment may be approached at two levels, one considerably more idealistic than the other. One approach might take the current status of the environment as a point of departure, and provide specific guidelines for future change. A more utopian approach might provide a broad perspective of environment, and is probably more important for its underlying philosophy and attitudes than for its specific proposals for environmental reform. What follows is an attempt to define the broad outlines of the latter kind of utopian environment.

Perhaps the most frustrating aspect of the whole of the American environment, especially the urban environment, is the lack of control one has over one's own environment. While sensing a state of complete environmental disrepair and chaos in a city like New Haven, Connecticut, for example, I have nowhere to turn for help, and can do little myself beyond asserting a personal environmental ethic (returnable bottles, Ivory soap, *et cetera*). It is this sense of frustration that permeates environmental courses, teach-ins and

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workshops, for although the Henry Caudills and the Paul Ehrlichs can vividly, if frighteningly, portray a self-reenforcing system that is slowly and apparently unavoidably losing control of itself, they can go no further. They offer no blueprint for a solution, for none exists. They have no vision to offer, for apparently none exists. They cannot even offer us possibilities for positive action, save for writing to our congressmen, a less than satisfactory solution.

In short, the present situation breeds frustration, with abundant bases for anxiety, concern and disillusionment, few constructive outlets, and limitless destructive ones. The power and money are in the hands of those who will not take the initiative along environmental lines, because they stand to lose in so doing. Caught squarely in the middle of the seemingly incompatible demands for both increased electrical power production and environmental quality, electric power companies continue to buy advertising time and space to promote power consumption, which can only serve to aggravate the problem. Proponents of the supersonic transport (SST) advance economic arguments on its behalf but do not state the advantages the SST would offer over existing airplanes, presumably because there are none.

My purpose in dwelling on this sense of frustration is that for me it imposes a mental block between environment as it is and environment as it might be. Precisely for the reasons I have discussed, I can see no way of implementing major environmental reform. Three delightful hours on the Metroliner train from New York to Washington are undercut by the decrepit trackbed, the dependence on automobiles at both ends of the run, the increasing trend toward decreasing rail service, and so on. The Metroliner is a token, not a trend.

With the foregoing as both introduction and apology for the fact that what follows cannot be implemented under the present system, I want to look at environment in ecological terms. The first step is to make energy the common denominator for all processes involving the transfer or transformation of matter. In ecological systems, a general rule states that as energy (or food) is passed from one organism to another in food chains (plants being eaten by little animals that in turn are eaten by bigger animals, *et cetera*),

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a significant amount of energy is lost (as heat) at each successive link in the chain. The greater the length of the chain, the greater is the amount of energy dissipated, and thus the greater the inefficiency of the transfer process. In natural systems, the length of these chains is surprisingly short—generally only about two to six links (or species)—owing to these constraints in the transfer of energy.

Already we have a loose framework in which to view and contrast life in New York City and life in, say, rural Vermont. The latter is analogous, at least potentially, to an animal low down in a food chain (close to the primary energy source), and therefore relatively efficient, while the inhabitant of Manhattan is many links distant from his source of sustenance. As energy is transferred from the steer in Texas to the slaughterhouse to the packer to the shipper to the distributor to the local butcher to the consumer in New York, energy is consumed and lost; the greater inefficiency is due in part to the obvious increase in handling, but also to increased spoilage (the hypothetical Vermont farmer grows and harvests only what he can eat or preserve within fairly narrow limits). From an energetic point of view, life in the city is more expensive than life on a small country farm.

Another ecological principle pertinent to the present argument is that it is expensive from an energetic viewpoint to arrest natural successional development at early stages. (Succession is the common ecological process by which an abandoned field or pasture is converted into a mature forest, which is the climax; thus the abandoned cornfield would be a very early stage in succession, while a young forest would represent a relatively late stage.) Indeed, this is one of the many prices modern agriculture pays in arresting the tendency of cultivated fields to return to natural forest or prairie. Similarly, for each person to maintain his own little piece of crabgrass-free lawn requires an input of energy (we could reasonably call it maintenance energy) in the form of lawnmowers, fertilizers and herbicides (weed killers). The swimming pools of southern California and Florida (and elsewhere) are totally dependent upon efficient filtering and recirculation systems plus fair quantities of chlorine to repress continuously the tendency of bacteria, algae

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and other organisms to convert these aquatic systems into, first, a eutrophic (enriched) pond and, finally, a forest, given sufficient time (maybe three hundred years).

There is thus a homeostatic tendency of natural systems, a tendency to return to mature, stable, climax conditions. It is probably fair to argue that the greater the departure from the natural ecological system, the greater the amount of energy needed simply to keep the system in that immature, unstable condition in the face of continual bombardment from both physical and biological forces. Weeds try to invade our lawns, golf courses and tennis courts. Insects share our apples. Frost heaves our roads; termites try to decay our houses, which we therefore (and for other reasons) erect on cement-block foundations. Indeed, one wonders how long it would take for places like southern California or much of Florida (to me these areas are synonymous with savage development and commercial exploitation), in the absence of all maintenance energy, to succumb to natural processes. Forests and grasslands are able to reproduce themselves; houses, sailboats and road signs must be repainted and replaced over and over again.

Before approaching the environment as a whole system, we need to consider one final generalization. Increasingly, as one moves from the small Vermont farm to the suburb to the big city, one loses more and more control over his environment, the price paid for the convenience in purchasing food and material goods at the neighborhood store. With increasing social, cultural and political complexity, there is increasing specialization of human function, with a consequent increase in the degree to which one person is absolutely dependent upon the activities of others. The rural general practitioner has yielded to a diverse group of medical specialists, each one of whom is competent to handle only a narrow range of medical problems, although presumably with greater efficiency and expertise than the G.P. Similarly, each rural Vermonter is an auto mechanic, at least to the extent that it is he who keeps the truck and tractor running, while in the city we have people who pound out fenders, others who repaint pounded-out fenders, and still others who have evolved to the point where they work solely on Volkswagens. The city dweller is entirely depen-

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dent upon the normal functioning of the postal workers, transit workers, truckers,* cab drivers and so on, while the Vermonter is, or at least has the potential for being, relatively independent of the activities of others.

The only long-term hope for this country, it seems to me, is to make government, industry and people more responsive to environment as a system. To this end I would do away with all state, county and city governments as presently constituted, and replace them with regional governments based on ecological boundaries. I submit that the watershed† is the most logical basis for government. Where individual watersheds are too small, as would be the case certainly in the Northeast, they would be combined until some sort of functional unit or basin was obtained (the watershed for an entire major river, for example). By definition, then, each governmental unit, regardless of how partitioned, would have complete control over its own water base and hydrologic pattern (to the extent that this can be manipulated through different land uses). Further, governmental jurisdiction would be coincident with the boundaries of a vital resource—water—thus eliminating jurisdictional and other disputes as to which of two or more parties is entitled to the use of a river, as is happening or about to happen in the far West and Southwest.

The regional watersheds would be laid out so that each would have roughly an equivalent per capita water base (this rule would have to be flexible, as other criteria to be discussed come into play). Sound planning would be facilitated, since the government of each regional watershed, having a fixed water base, would have to come to grips with the problems of budgeting a fixed resource among competing, if not incompatible, demands. For example, within limits, a certain quality of life could be defined in terms of average per capita consumption or use of water (including consumption in primary, secondary and tertiary treatment plus "use"

* On a radio program dealing with the impact of a threatened Teamsters' strike, it was estimated that New York City has only about two-and-a-half days' supply of food in its stores (not including private homes), which indicates the extraordinary rate at which energy (or food) must flow through this city to sustain its life.

† A watershed is a parcel of land drained by a brook, stream or river. It may be a small piece of land feeding a small stream or a large drainage basin for a major river.

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for recreational and aesthetic purposes). Of course, additional water (or in some cases the same water) would have to be set aside for many purposes, including generation of electric power and industrial cooling. This kind of thinking would force the regional governments to set upper limits to the numbers of people, power plants and industries that could be supported by a fixed water supply.

One of the bases for deciding on the optimal size of regional watersheds would be the diversity of ecosystems, topography and climate (lakes, forests, grasslands, deserts, mountains, *et cetera*), in an attempt to minimize the tendency of people to move often simply because of shortcomings in their working and/or living conditions.

Each regional watershed would contain a single major city that should be located near the geographical center of the region. The population of the city should probably be not smaller than 500,000 (at 150,000, New Haven is far too small) or larger than 4,000,000 (at twice this size New York is far too large). I would start with a city of 1,500,000, or slightly larger than Minneapolis, to ensure the survival of the urban amenities—museums, galleries, theaters, opera, *et cetera*. The city would be defined as a circle, inside of which neither cars nor trucks would be permitted. Abundant, free subway service (or comparable mass transit) would be provided, and bicycling and walking encouraged. If feasible hydrologically, a canal system would be built as an additional means of transportation and as a recreational and aesthetic resource. Public athletic facilities would be extensive and convenient so that one could play squash (or whatever) day or night. Extensive park areas would help diversify the urban complex. Still other land would be earmarked for people to use in small-scale agriculture and flower growing, as is apparently the practice in one section of Boston. There would be no private ownership of land or buildings, nor would one- or two-family houses be permitted. Housing would be in high-rise apartment buildings designed to foster some sense of neighborhood to which people could relate in the face of urban anonymity.

The problem of how much and what kinds of industry to encourage within the city (and within the larger regional watershed, for that matter) is not easily resolved. One obvious generalization

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is that only the best in pollution-control equipment would be tolerated. The crux of the industrial problem, however, lies in the larger question: To what degree are our presently accepted trends in consumption incompatible with environmental quality? Because the answer to this fundamental question is unknown, I react conservatively and maintain that the extent of incompatibility is considerable. Accordingly, I would separate all consumables into three categories—necessary, useful and superfluous—ban outright the manufacturing of the last group (electric socks and electric toothbrushes), and restrict the manufacturing of all other consumables to two or three brands per product. For a given product, the two (or three) brands could be selected at random from the ridiculously large number now available, and those selected would be replaced only if it could be proved in court that a new product offered something useful not offered by one of the existing brands, or that it was made in a way that did less harm environmentally than the existing brands.

Fast train service could carry people back and forth between the city and the country. Three types of train service might exist: 1) intrawatershed trains would leave the city along each of four to six radii, make stops for only as far as about half the distance between the city and the watershed boundary, and then return to the city; 2) interwatershed trains would leave one city for another (rail service would be provided only between the cities of adjacent watersheds), stopping at points farther than one-half the radius from each city; and 3) other trains would travel nonstop from a given city to each city in all adjacent watersheds, thereby eliminating much of the need for short-distance airline service. All trains would be owned and operated by the federal government.

To meet the need for individual mobility, automobiles (or preferably a cleaner and quieter means of transport) would be available at each of several subterranean storage and maintenance facilities positioned along the rail routes. All cars would be publicly owned and available to individuals for a charge to include both time borrowed and distance traveled. As in the case of other consumables, no more than two brands of cars would be tolerated, and not more than two sizes, large and small. One important ad-

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vantage to public ownership is that not only would the best in pollution abatement equipment be mandatory, but also its proper maintenance, essential to its efficient functioning, could be rigidly controlled. It is precisely the lack of this control that makes Detroit's present efforts ludicrous; the burden of maintenance is shoved onto the individual car owner, who is generally unwilling or unable to make the financial sacrifice. As Garrett Hardin pointed out in an article in *Science,* reliance upon the individual in such matters is doomed to failure; the individual, forced to choose between making a large personal sacrifice (the increased expenditure for maintenance of pollution control equipment plus a decrease in mileage) and an immeasurably small communal sacrifice (the increased environmental degradation, distributed over the entire community, caused by an individual's failure to abate exhaust emissions), will obviously tend to act in a manner that is ultimately disadvantageous to the welfare of the community at large. Under the present system, what is good in the short term for the individual may prove disastrous for the long-term good of the community.

Any successful blending of urban and rural life must be based on sound and enforceable land-use policy, to prevent the increasingly antiecological patterns we see all around us. I believe that suburban life is an unhappy and shallow compromise of two potentially rewarding extremes—urban and rural life—and that each suburban resident would thus be better off either in a legitimately rural setting or in an enlightened urban environment as described above. The guiding principle for land use and development, then, would be that where land is used (within the city limits), it be used intensively, and, in all other cases (outside the city), natural ecosystems be disturbed as little as possible so as to minimize maintenance energy.

The combination of private ownership of land and the absence of a genuine land ethic is at the base of the current tendency toward land speculation and subsequent uncontrolled development. Proposals to compensate private landowners for what they would lose by not selling to the speculator are really only gimmicks in that they do not direct themselves to the real problem, which is

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one of understanding the ecological and aesthetic values of natural, undeveloped land. Such compensation is symptomatic of a deeply perverse value-system, which cannot come to grips with the significance of natural land except by equating an acre of forest with a bowling alley, a supermarket and two parking lots. I would therefore emphatically abolish all private ownership of land.

Eliminating private ownership of land will not, by itself, solve the problem of how to permit people to live in a truly rural environment without its gradual conversion in time to a suburban environment. Certain obvious steps would have to be taken. Large chunks of wilderness within each regional watershed would be set aside and maintained as wilderness open only to those who enter on foot. Different kinds of parks would be established, from those that maximize convenience (picnic tables and flush toilets) to those that, although entered only by foot, provide shelters and other minimal conveniences. Still other land would be devoted to agriculture, and a basic question would be: To what extent should each region strive toward self-sufficiency? I would argue that generally no more resources should be brought into a region than are exported to other regions. Again, energy, rather than economic criteria, is the only reasonable common denominator for measuring the flow of resources between regions.

On a regional basis, complete self-sufficiency is unrealistic. Many of our fruits and vegetables are grown in Florida and California, and it would be absurd to make dietary concerns a major determinant in choosing where one wishes to live. Thus the major geographic patterns in agricultural production would necessarily persist; we obviously cannot grow oranges in Maine. It is desirable to aim for self-sufficiency simply because the further removed from the life-support system a person, society or government becomes, the more blurred is the relationship of man to the natural environment. Once meat, corn and milk come from the grocery store rather than from the land, it becomes impossible for any meaningful land ethic to gain wide acceptance. Land must be equated with life. The point of striving toward regional self-sufficiency is to bring as close to home as possible much of the life-support system.

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There is no reason why the United States as a whole, including Alaska, should not attain complete self-sufficiency. In its present state, the United States is a huge energy sink, attracting and consuming resources in vastly greater quantities than are being exported. Ideally, of course, the whole Earth would be considered as a single system, defined in terms of energy inputs (solar energy), energy-fixing capabilities (forests, oceans, agriculture, *et cetera*), resource base (renewable and nonrenewable), and so on. But to erase national boundaries to the extent necessary to implement a whole Earth system is far more unrealistic than the admittedly unrealistic proposals for regional watersheds. So I consider only moderately unrealistic the notion that the United States ought to move with all deliberate speed toward this end.

I finally consider the matter of providing rural residency for individual groups or families. In providing homes for individuals wishing to live outside the city, two obvious problems arise: 1) it is conceivable that within a given watershed too many people would desire such residency; and 2) if left to itself, development would tend to erode the quality of rural life to the point where suburbs would emerge. Problems like these would have to be prevented by close governmental control over land use. Once rural land was allocated for wilderness, various kinds of parks and recreational areas, and agriculture, there would remain only a restricted amount of land for rural living. Zoning laws would then carve up the land into farms of not less than one hundred and fifty acres, which would be rented (on long-term leases) to individuals for nominal fees. The whole philosophy of rural life would be independence and self-sufficiency. To this end, each farm would support dairy and beef cattle, sheep, hogs and chickens, and would raise as many different varieties of crops and fruits as local soils and climate would permit.

Small villages of some sort would have to be incorporated into the rural plan to supply goods and services relevant to rural life. To minimize the encroachment on rural land, such villages could be positioned at the major stops along the various rail routes.

Without dwelling further on details, a great many of which have been omitted, I conclude by defending this essay on the

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grounds that it offers a vision of what Joseph Wood Krutch called, in an AMERICAN SCHOLAR article, "the best of two worlds." From the President on down there is much talk about environment and pollution; but we need much more than is presently being talked about and proposed. We need visions of a total environment geared toward long-term sustenance of life; we need visions of radically different life-styles, which place emphasis on the dignity of man and on natural land and natural process. Who knows, for example, the extent to which problems like urban crime are an expression of the generally deplorable living conditions of most American cities?

Krutch's two worlds are the world of the city and the world of the country. He argues, and I would agree, that being in a position to experience both, one is in the best of all possible positions. Thus the major components of my environment are enlightened cities, unblemished country, and a cheap, clean, quiet and fast means of getting from one to the other and back. The suburb is an unhappy compromise; it offers nothing that is not better in either the country or the city. It is probably obvious by now that my own heart lies in the country, as did Krutch's: "Everything [in the country] reminds me that man is an incident in nature rather than, as one comes to suppose in the city, that the natural is, at most, an incident, surviving precariously in a man-made world. If I do on my own a little of that peeping and botanizing which Wordsworth scorned, I think that I profit less from what I learn *about* nature than I do from what I should prefer to call the example she sets me—the example, I mean, of confidence, of serenity, and, above all, of joy."

I must end, as I began, on a pessimistic note. We have created an industrial monster, which, being easily aroused by the smell of money, continues at will to devour our rapidly vanishing, virgin landscapes, excreting progress in the process. At present, the massive strength of this monster defies attempts to curb its appetite.

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Painters' Painting: Cubism

ROY McMULLEN

TURNING POINTS IN NONMILITARY HISTORY are notoriously hard to specify; nobody seems to have been around, for instance, when the horsecollar was invented, or when Grimm's law took effect. Few such points, however, are as movable as the supposed date of the emergence of "humanism" in Western painting. Should we, in company with many specialists, push it back merely to fifteenth-century Tuscany? Or perhaps to Giotto? To the Romanesque break with Byzantine otherworldliness? To ancient Athens? Still further back?

Defining pictorial humanism is, of course, part of the difficulty. In an early Renaissance context, the phenomenon may be just a secular reaction against Gothic religiousness. Later on, it becomes a rather stately doctrine reflecting humanistic literary theory and insisting on the painting of ideal imitations of human actions and emotions. In many minds, it is largely a matter of the lifelike representation of people in an illusion of humanly habitable space; as such, it can be said to call for academically correct drawing, colors, tone values, foreshortening, perspective, and so on. But, in many other minds, it can be said to call for nothing more than a recognizable pride in our humanness, a heightened awareness of the zone between the animal and the allegedly divine, a certain eagerness to regard man as the center and the organizing principle of the pictorial universe. And then an almost infinite recession of possible beginnings confronts us.

This uncertainty about origins deserves mentioning, because it makes all the more impressive the fact that, for once, we can defy the rule of turning-point vagueness, and situate fairly exactly the end, or at least the beginning of the end, of the

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tendency in question—whatever definition of it is adopted. We have only to glance at some pictures that are typical of the Cubist revolution in Paris between 1908 and 1914. Here, obviously and aggressively, the analogy between painting and humanistic literature was dropped, lifelikeness forsaken, illusionistic space utterly unraveled, and the old Western image of lordly man shattered. No change in art, I suppose, should be deemed irreversible, but today the consequences of Cubism are plainly still with us, so much so that critics feel safe in assuming that a painter is minor if he indulges in such obsolete tricks as classical human proportions, mathematical perspective and heroic storytelling.

We can even be reasonably precise about the beginning of the beginning of the end, for it is quite apparent in Pablo Picasso's proto-Cubist *Les Demoiselles d'Avignon*, painted and repainted and re-repainted (it seems never to have been actually finished) during the winter of 1906-07 in the ramshackle Montmartre building known, because of a supposed resemblance to a Seine laundry boat, as the Bateau-Lavoir. In this still nightmarish picture, whose ironical title was inspired by memories of a brothel in a Barcelona street named "Avinyo," the stifling space, the square breasts and the dislocated noses are possibly less unsettling than the dark depravity in the damsels' eyes. If pictorial humanism can indeed be partly described as heightened awareness of a zone between the animal and the divine, from which medieval artists frequently, although not always, took the upper exit, here an impulse toward the lower exit is discernible.

Looking back at the dramatic days when the paint on the sinister *Demoiselles* was fresh, we can be struck first of all by the alertness of Paris painters and vanguard intellectuals. Although Picasso did not exhibit the canvas, it quickly became famous. Guillaume Apollinaire, so socially ubiquitous one wonders how he found time to write verses, brought friends up to see it. The ex-Fauve Georges Braque, shortly to become the coinventor of Cubism proper, was among the many who felt the historic cultural shock. "In spite of your explanations," he told Picasso, "your picture looks as if you wanted to make us eat tow, drink

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gasoline, and spit fire." The poet and art critic André Salmon, one of the familiars around the Bateau-Lavoir, registered for his memoirs a kind of prophetic hunch:

> These are masks almost entirely freed from humanity. Yet these people are not gods, nor are they titans or heroes, not even allegorical or symbolic figures. They are naked problems, white numbers on the blackboard.

He also noted that in the Montmartre inner circle the new work was nicknamed "the philosophical brothel."

More impressive, however, than these signs of an end-of-epoch atmosphere is the way the revolution gathered speed during the following seven years and discovered other exits from pictorial humanism, exits that eventually opened on strictly nonanimal zones and made the *Demoiselles* what it is now for most art historians: not an example of Cubism proper, but rather the expressionistic detonator of Cubism.

During 1908 and part of 1909 Picasso and Braque, frequently functioning enough as a team to make their pictures indistinguishable for nonexpert eyes, went through what is referred to sometimes as the Cézannean phase of the movement and sometimes as simply the first part of the "analytical" phase; typical works exhibited slab volumes, sober coloring, shallow space, and a tendency to abandon the single viewpoint of mathematical perspective. By 1910 the revolutionary partners were well into the so-called "hermetic" part of the generally analytical phase; in typical works the colors were gray or greenish, the space was so squeezed as to be almost flat, light sources and viewpoints were multiplied, volumes were often made transparent, facets were wrenched into apparently illogical simultaneous view, and contours were broken so as to open passages from one volume or facet to another. In sum, people and things were analyzed into fragments suitable for distribution on a two-dimensional surface.

In late 1911 or early 1912 Picasso introduced a piece of real oilcloth into a picture, thereby inventing *collage;* and a few months later Braque pasted some wallpaper to a drawing as a

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PABLO PICASSO. *Les Demoiselles d'Avignon.* 1907. The Museum of Modern Art, New York. Lillie P. Bliss Bequest.

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substitute for paint, thereby inventing *papier collé*. The theoretical difference between these procedures, which was seldom stated and did not always hold, was that the former brought outside actuality into the merely virtual realm of art, whereas the latter was only another artistic medium, a way of representing actuality for a willing imagination.

By 1913, according to a common view of their evolution, the two artists were in a phase that should be called "synthetic" Cubism. The adjective is confusing, for it has been employed by various critics to refer to a pair of quite distinct artistic processes: the fusion or synthesis into a single image of fragments obtained by visual analysis, and the invention of a highly stylized single image directly on the canvas, an image that is synthetic in the sense of being artificial or purely man-made, like nylon. In any event, works typical of this final prewar (and to some extent postwar) fusion-or-invention phase were marked by a return to more vivid colors and by a rejection of the hermetic spider-web look in favor of relatively coherent and identifiable—at least for the initiated viewer—figurative forms. Many of the new colors and forms, even when rendered in conventional oil paint, were noticeably the results of experiments with *collage* and *papier collé*.

In short, by the time of Sarajevo the art of making pictures had been practically reinvented. And while this unprecedented acceleration of stylistic change was going on, Picasso and Braque were rapidly winning followers, some of whom were major talents and some of whom were at least estimable. Among the major were Juan Gris and Fernand Léger; among the estimable were Jean Metzinger, Albert Gleizes, Louis Marcoussis, Jacques Villon, Marcel Duchamp, Robert Delaunay, Roger de La Fresnaye, André Lhote and Francis Picabia. Few were completely orthodox by Picasso-Braque standards, and several went on to other styles, as did Picasso himself; but all were permanently affected by the Cubist adventure. So were many artists who remained outside the movement: Marc Chagall, for instance, and the Italian Futurists.

The growth in the number of practitioners was accompanied

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by an extraordinary flowering of theory. Half a century later Braque told an interviewer: "During those years we said things to each other, Picasso and I, that nobody will ever say again, that nobody will know how to say. . . ." Léger wrote essays on "the modern conception." Duchamp and his brother, Jacques Villon, speculated on the Golden Section and other mathematical mysteries. Each exhibition was an occasion for an explanatory article, a catalogue preface, or perhaps a public lecture. Plato, Schopenhauer, Nietzsche, Kant, Locke, Berkeley or Descartes might be mentioned in passing, in the manner of a devout Frenchman referring to favorite saints. Although nobody involved seems to have been aware of Einstein, there was some misty talk about the fourth dimension. In a more serious vein, Gleizes and Metzinger published in 1912 a sort of combined manual, defense and illustration under the title *Du Cubisme,* and within a few months the book was out in several foreign editions. That same year saw the appearance of partly anecdotal histories of the new style written by Apollinaire and Salmon. In 1913 the critic Maurice Raynal, who was friendly with the Picasso group in Montmartre and also with the group around the Duchamps in suburban Puteaux, brought out a carefully reasoned answer for laymen who wanted to know why painters had lost the desire to depict sunsets.

Conservative howls were as useful, in publicity terms, as avant-garde sermons. By 1909 the label "Cubist," although frequently inappropriate, was becoming familiar to French newspaper readers. (Originally derisive, like "Gothic" and "Impressionist," it emerged from remarks in 1908 by Henri Matisse and the critic Louis Vauxcelles, who was also responsible for "Fauve.") By 1911 the new artists were numerous enough to provoke splendid scandals at the big annual French salons; they were helped by official demands in the Paris Municipal Council and the Chamber of Deputies for police action, on the grounds that they were "apaches" who had insulted "human nature and the human form." At the Manhattan Armory Show in 1913 they were greeted by a fountain of fuming rhetoric, which included such phrases as "lunatic fringe," "cousins to the anarchists,"

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"unadulterated cheek," and the memorable "explosion in a shingle factory" that was directed at Duchamp's *Nude Descending the Staircase*. By 1914 they had been profitably drenched in public wrath not only in Paris and New York, but also at shows in such far-flung spots as Berlin, Munich, Cologne, Zurich, Moscow, London, Barcelona, Brussels, Prague, Budapest, Amsterdam, Florence, Tokyo, Chicago and Boston.

An upheaval of such abruptness and proportions evidently calls for explanations that go beyond the standard "influences." The latter are interesting and enlightening, of course, within their limits. For example, there was a large Cézanne retrospective at the Paris Salon d'Automne in 1907, and the influence is plain in the work of the leading Cubists. There was also, from about 1906 on, a vogue for primitive art, African sculpture in particular, among French painters, and again the effect on the leading Cubists is visible. In a more general and not always conscious way, they seem to have been touched by a current of admiration for many previously neglected achievements: Egyptian draftsmanship, Greek and Etruscan archaic statues, Iberian reliefs, Mesopotamian figurines, and (at least in Picasso's case) the distortions of El Greco. But none of these facts quite accounts for the sudden revolutionary ultraism of Cubism. Why were the leaders of the movement so keen on continuing into new territory the Cézannean analysis of forms? Why did they react so vigorously to the impact of African sculpture and of other arts that lay outside the humanist tradition? In brief, what were they thinking about?

Three surprisingly definite answers to this apparently hazy question can be found in their work and in the period documentation that has been amassed by recent scholarship (notably in studies by John Golding, Guy Habasque and Edward F. Fry). They were thinking much of the time about the simple fact, which generations of expert illusionists and perspective-makers had tried to ignore, that a picture is actually as flat as a pancake. They were also thinking, often when they seemed most intent on shocking the common sense of a viewer, about realism. And finally, although on occasions they may have pretended other-

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wise, they were obviously thinking about the purely formal aspects of painting—about art for art's sake. Flatness, realism and formalism, more than anything else, were what destroyed the analogy between visual representation and humanistic literature, ruled out lifelikeness, unraveled Renaissance space, and shattered the old image of man.

It may be objected that to regard hundreds of handsome Cubist paintings as mere demonstrations of theory is to deprive them of their appeal as art. But naturally the point is not to regard these works as "mere" anything, anymore than the point of mentioning mathematical perspective in connection, say, with Piero della Francesca is to regard his pictures as mere illustrations of optical discoveries. The best products of Cubism are masterpieces of painting, drawing and mixed media, not of dry lucubration. They are often as personally expressive as graffiti. They are full of sly humor, affection and compassion even when they are manifestly engaged in dismantling what the indignant French politician called "human nature and the human form." They contain flights of lyricism of the kind that occur when an accomplished artist, with his brain, eye and hand working in perfect coordination, simply lets one detail in his picture inspire the next one. In addition to all this, however, they are reflections of some sustained thinking about flatness, realism and formalism.

Concerning flatness, there can be little argument. An intention to respect the two-dimensionality of the picture plane, to avoid as much as possible any suggestion that a painting is an open window or a deep stage, is already evident in the cramped room, the profiled noses, the forward-tilted fruit, and the general lack of high-relief lighting and of foreshortening in *Les Demoiselles d'Avignon*. If it is considerably less evident in the Cézannean forms of the early analytical phase of the movement, it returns with full force in the facets, broken contours and peculiar airlessness of the hermetic period. By the time of *collage, papier collé* and synthetic Cubism, flatness is obviously one of the governing principles of the style. Even when there is a hint of the third dimension, as there must be when one thing is supposed to be behind another, it may be managed with receding flat sur-

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faces, and often the illusion of depth is canceled by a kind of spatial ambiguity: a surface that is behind another in one part of the picture may seem to be in front of it in another part.

Concerning realism, there can be unending argument, since no one has ever managed to prove what realism really is. Fortunately, we are not obliged to share an artist's philosophical or scientific opinions in order to appreciate his work, and if the quality of artistic achievements depended on the soundness of the theories behind them, most of the paintings in our museums would be intolerable. We are, however, if we are to judge fairly, under an obligation to know something about an artist's aims; and here, in view of the distortions in Cubist paintings, we encounter an apparent paradox. Nearly all the orthodox Cubists, their exegetes, their sometimes heretical disciples, and even some of their enemies were eventually in agreement that Cubism, whatever else it might be, was at bottom a variety of realism. Were all these people engaged in propagating a myth? It is hard to think so.

An insistence on respecting the actual flatness of the picture plane was a rejection of illusionism and hence, arguably, a kind of realism. So, emphatically, was the practice of *collage,* although it could lead to some strange equivocalness and eventually to questioning the very existence of art. So, again arguably, was the pictorial use of free-floating stenciled letters, which Braque began in 1911 because of a wish, he explained later, "to get myself as near as possible to a reality." So, at least ostensibly, was the matter-of-fact approach to the problem of pictorial meaning, which the establishment painters of the nineteenth century and earlier had tried to solve by the use of long literary titles. When Braque felt like paying a tribute to the nobility of music, he simply stenciled the name of Bach into a composition. When Picasso wanted to express his elevated sentiments for a current mistress, he wrote on the canvas, like a schoolboy decorating a wall, *J'aime Eva.*

GEORGES BRAQUE. *Still Life (Guitar).* 1913. Philadelphia Museum of Art. The Louise and Walter Arensberg Collection.

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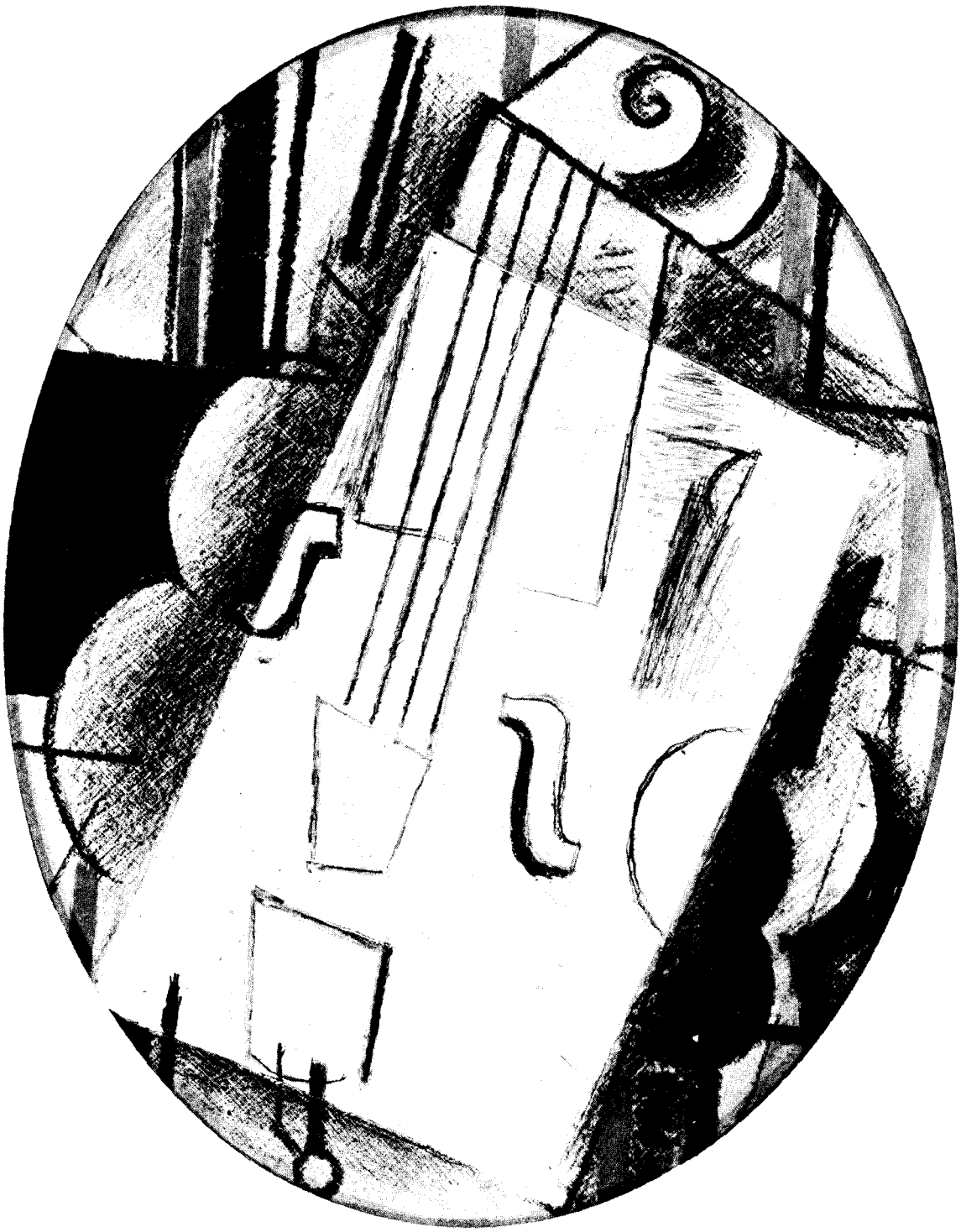

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The pace-setting Cubists, like the Impressionists of the preceding generation (Monet and Renoir, it should be remembered, were still active), could also maintain that they were realists in their choice of everyday things and people as subject matter. In this respect they outdid the realistic Courbet, their "father" in Apollinaire's opinion, who had told the Second Empire that anybody who wanted him to paint an angel had better show him one. Their iconography, to use a term whose fanciness they would have rejected, ruled out religious themes, moral allegory, heroic history, Greek mythology, idealized nymphs, and the rest of the humanist-academic tradition. They were particularly given to still-life compositions incorporating ordinary stuff around the studio: bottles, goblets, pipes, cigarette packages, newspapers, musical instruments. To this genre they added occasional landscapes or townscapes (especially during 1908 and 1909), sober structural studies of nudes, and visual analyses of friends.

The lack of pretentiousness in pictorial techniques, meanings and motifs was not, however, nearly as important as another variety of alleged realism, one that swiftly evolved, in ways that had an inner logic hard for conservatives to fathom, into a complete break with the notions of the older generation of painters. In fact, it was this other variety that commentators usually had in mind when they referred to Cubism as a realism.

A principal point of departure for the evolution was the joint conviction of Picasso and Braque—who were advancing, in the latter's words, "roped together like mountaineers"—that Impressionism had gone too far in its dissolving of forms with color and light. The conviction is evident in the muted hues and sculptural effects that are characteristic of the early, or Cézannean, part of the analytical phase; and Braque was even willing to argue that Monet and company had been wrong in their shimmering approach to the treatment of emptiness. "What attracted me a great deal," he said in another of his later explanations, "and what was the master direction of Cubism, was the materializing of the new sense of space I was experiencing—for in nature there is a space that is tactile, almost handleable."

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In this return to volumes and weightiness there was an implication, as there had been in the work of Cézanne, that what was needed after the orgy of sunniness was a curative spell of solid classicism, and so a number of the less imaginative talents on the fringes of Cubism were soon backsliding toward a sort of modernistic Poussin style. (The actual sequence of events was, of course, not so straight as this account may suggest; there were zigzags and jumps.) But the more adventurous spirits moved ahead. They decided that what was wrong with Impressionism was not just the blurring of forms; it was the whole theory that painters should strive to put on canvas the images registered by the human retina. The mind, not the eye, was the proper instrument for grasping reality.

On this point, the recorded remarks of artists and friendly critics are a chorus. Here is Picasso, personal as usual in his approach: "I paint things as I think them, not as I see them." Here is Braque, aphoristic as usual: "The senses deform, the mind forms." Gleizes: ". . . I have been aiming at *a realism* [his italics], but a new kind of realism, different from that of Courbet, for whom the impression of the eye sufficed; I place these impressions under the control of the intelligence and of knowledge." Metzinger: "Cézanne showed us forms living in the reality of light, Picasso brings us a material account of their real life in the mind. . . ." Léger: "It is the logical spirit that will obtain the greatest result. . . ." Apollinaire: "Everyone must agree that a chair, from whichever side it is viewed, never ceases to have four legs, a seat, and a back. . . ." Raynal: "Who will fail to be astonished by this marvelous idea, taken up afresh from the Primitives after the stuffed shirts of the Renaissance had forgotten it, the idea of painting conception instead of painting vision?"

The immediate result of the "marvelous idea," during the hermetic period, was a tendency for pictures to become collections, not of images, but of frequently illegible signs—the painters' private hieroglyphs for aspects of reality that had presumably been grasped and retained by the mind's eye. Picasso and Braque were alive to the danger, and did their best to counter it by providing their works with keys for decipherment exe-

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cuted in the old-fashioned illusionist or retinal manner: a readable violin sound hole, for example, or an identifiable fragment of a human face. But in spite of these concessions there were embarrassing failures to communicate; an admirer of Cubism who bought Picasso's *Accordionist*, painted in 1911, is said to have cherished it for years as a landscape.

Legibility improved with the appearance of more coherent images during the synthetic phase, the chief aspect of which was eventually formulated by Gris in a characteristically neat way: "Cézanne turns a bottle into a cylinder. . . . I make a bottle . . . out of a cylinder." But by that time another problem had appeared: there was an evident willingness in many viewers to give up on a difficult picture and simply enjoy it as an attractive piece of decoration or of nonfigurative art, and this was possibly even more deplorable than the mistaking of accordionists for landscapes. For, of course, a "realist" could not logically let himself go over the edge into abstract painting. (Significantly, none of the major Cubists, then or later, ever did, which is not to say that Cubism did not encourage other artists, notably Mondrian, to take the final step.)

Examining this surprisingly rapid evolution on the assumption that it was not somehow fated by the stars, we are likely to return again and again to the break with the so-called retinal approach of the Impressionists—of nearly all Western European painters, in fact, back to the end of the Middle Ages. This break was more rational than emotional, more classical, in a sense, than romantic. It was the exact opposite of what believers in a "lunatic fringe" suspected. It was not a decision to paint dreams or wild imaginings; it was rather, in intention at least, a decision to paint knowledge: the fact, to use Apollinaire's example, that a chair still has four legs even if at a given moment from a given point—in the conditions, that is, of Renaissance humanistic perspective—we can see only two. Allowing for important differences in the choice of details, we might say that what Picasso, Braque and their followers set out to do was like making blueprints, which are also pictures of what we know rather than of what we see.

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Contributing causes for the break are not hard to find. One was undoubtedly the contradiction, which can be seen in many pictures of the Cézannean period, between trying to be realistic in terms of non-Impressionistic sculptural forms and trying to be realistic in terms of pictorial flatness. Another was the influence of primitive art; African sculpture, for instance, was clearly conceptual rather than retinal in inspiration. Another was the influence, hard to nail down, of the cultural climate. Whereas Impressionism had got under way in an atmosphere of country hikes and scientific or pseudoscientific research, Cubism got under way in an atmosphere of Montmartre studios (for years Picasso painted mostly at night) and philosophical or pseudophilosophical talk.

These causes do not, however, quite account for the fact—and it is unquestionably a fact, however uncomfortable it may make an earnest theoretician of Cubism—that for the average viewer a Cubist picture is much closer to abstractionism than to mental realism. To account for this, we have to assume that much of the time Picasso, Braque and their followers were thinking not only about flatness and realism, but also about what I have risked calling formalism, or art for art's sake. We have to assume that they were not, after all, exclusively interested in turning out refutations of Impressionist illusionism.

The assumption is easily documented. The notion that in a pictorial situation the painting itself is what is really real, more real at any rate than the represented percepts and concepts, can be found jostling for attention as early as 1912, in writings that are at the same time preaching the virtues of mind-art over eye-art. Here is the always critically alert Raynal: "What finer idea can there be than this conception of a *pure* painting, which shall in consequences be neither descriptive, nor anecdotal, nor psychological, nor moral, nor sentimental, nor educational, nor (lastly) decorative?" Gleizes and Metzinger: "The true picture . . . bears its *raison d'être* within itself." Apollinaire: "The secret aim of the young painters of the extremist schools is to produce pure painting."

The assumption is also to some extent implicit in the Cubist

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choice of everyday subject matter. We can feel that medieval painters and the African sculptors of the authentic tribal era had powerful incentives for avoiding retinal art; they had to convey important conceptions about such august invisibilities as gods, saints, mana and ancestors. But it would take a good deal of credulity to suppose that Picasso and Braque were passionately interested in extracting invisible reality from goblets, newspapers, cigarette packages and musical instruments. Their noticeable preference for still life is significant in this respect, since still life is by far the most "unreal" of the traditional genres, the most amenable to formalism. Unlike portraiture and landscape, it permits a large amount of prearranging—of preaestheticizing.

All this is not to say that Cubist realism was merely an abstruse aberration or a lot of highfalutin talk. It was a serious attempt to apply to the art of painting the elementary notion, which was as old as the philosophy of Plato and as new, although the Cubists were in total ignorance of the fact, as the phenomenology of Husserl, that our senses deceive us and that things have a reality, an essence, capturable only by the mind. There are many Cubist works in which a properly attuned viewer can catch an elusive perfume of something timeless and permanent, something radically different from the tender ephemerality exuded by an Impressionist painting. And we should not forget, in mentioning formalism, that the Cubists were loyal enough to their realism to stop short of completely nonrepresentational art.

But finally it must be granted that Cubist realism, examined in the now lengthening perspective of the history of twentieth-century painting, was important less as realism than as a variety of aesthetic permissiveness. It released artists from almost the last felt obligation to obey the ancient rules of pictorial humanism. Combined with the new respect for the flatness of the picture plane, it conferred a doctrinal blessing on what was often simply an impulse, thoroughly respectable in itself, toward formalism—toward treating a painting as nothing but a painting. It thus fostered in the visual arts an equivalent for the nothing-but-ism, the reductionism, that had already undermined humanism in theoretical physics, Freudian and behavioristic psychology, the social sciences and other cultural areas.

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History: A Discipline in Crisis?

OSCAR HANDLIN

THERE WAS A TIME when no one was more faithful than I in attendance at the annual meetings of the American Historical Association. But more than a decade ago I stopped going because these gatherings, pleasant as they were in other respects, had moved so far from the proper business of the historian as to empty the ritual of justification. I came back once more in December, 1970, partly out of nostalgia and partly in response to an invitation suggesting the retrospection appropriate to advancing age. The occasion did not convince me I need soon return.

The first A.H.A. convention I attended assembled a third of a century ago at Providence, Rhode Island. I was young and, no doubt, naïve, a third-year graduate student. I had one foot in at Harvard, but most of me was still in Brooklyn, which perhaps accounted for the excitement of the sessions, the exhilaration of talks with men whose names graced the title pages of books I had read. Ideas seemed everywhere in circulation through the corridors of the Biltmore; and I recall to this day the cordiality of older men—Howard K. Beale, Paul Lewinson, Eugene Anderson, Hans Rosenberg—who made me feel at once involved in a group of shared values and interests. It was to edge into this fellowship that I had joined the Association while still an undergraduate; and this token of fulfillment of the desire to be a historian was ample reward for the costs I could then ill afford.

Had I known then what I know now, I might well have chosen a different line of endeavor.

My dissatisfaction is not personal. I am not aggrieved at the

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status I have achieved or the position I hold; I have completed some of the work I wished to do; and the number and the quality of the students with whom I have had the good fortune to associate has been gratifying. My discontent focuses on the state of the discipline. Not that there are fewer good scholars now than then, or fewer good books; and comparisons of the relative merits of the ancients and moderns are, in any case, beside the point. Nor is it simply the Oliver Twist reflex—that, having gotten something, we want more. The annoyance arises rather from expectations unfulfilled—expectations that were perhaps unrealistic, although not unworthy.

I embarked upon historical research as an explorer conscious that every great discovery was one that revealed a continent of ignorance, the importance of which would unfold from subsequent discoveries. I had not yet written anything, but I hoped, in time, to produce a book, the value of which would be measurable by its location in a living stream of thought composed of the works that followed as well as those that preceded it. I would not have expected then that almost three decades after its appearance that first book would still stand not outdated—literally inconsequential. And now in retrospect I perceive that this was the fate of the best historical writing of my generation.

A comparison that is, on the face of it, immodest and exaggerated is nonetheless illuminating. It is evidence of strength, not of weakness, that the work of the physicists of the 1930s has long been outdistanced. That history developed differently is an indication, *at the very least,* that the discipline does not conform to the pattern of other sciences; and that calls for an examination of the assumption that it does or should.

The expectations I inherited in the 1930s had been nurtured for perhaps a half century. They were professional, transmitted through a small group of men and women, internally cohesive and held together by adherence to common standards and convictions. The convention of 1936 was large by the criteria of the times, but its nine hundred and fifty-six registrants were together guests at lunch of Brown University, a gesture that was symbolic of a sense of unifying purpose that overrode differences in background, interpretation and points of view.

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It is hard to convey the sense of that unifying purpose other than in personal terms. Four of my teachers—Charles H. McIlwain, Frederick Merk, S. E. Morison, and Arthur M. Schlesinger—had treated the American revolution, each in a distinctive fashion. Yet the student, confronting that array of divergent viewpoints, found no cause to doubt that a common standard of scholarship animated all four historians. Indeed, McIlwain's presidential address at the Providence meeting emphasized the continuity and integrity of the historical enterprise. When later I encountered Charles Peirce's description of the "community of investigators" laboriously inching the world toward truth, it seemed the perfect term for our company.

I retained the faith in that community through most of my career. I believed that I associated with co-workers laboring toward an end that was the same for all of us; it simply never occurred to me to take account of ethnic, religious or ideological factors in dealing with a student or colleague or, indeed, with any scholar and prospective scholar whom I could help. If John Higham came to talk with me about his dissertation or Staughton Lynd sent me something he had written, I thought I responded solely out of a desire to further their own work, not out of calculation of what might come of it or with the intention of exerting influence upon the product. In the past thirty years I have read some thousand manuscripts, not counting the papers and dissertations of my students, at an enormous cost in time for no conceivable reward other than the furtherance of a common purpose. I went fifteen years without a leave of absence, while expending the funds that gave leaves to more than a hundred other historians, and did not count the opportunity wasted since a common effort involved us all.

A change has occurred, and I may have been slow to perceive it. I can recall the blank incomprehension just a few years ago with which I learned that we were expected to think not of historians, but of schools or types or parties among historians, cut apart from one another in criteria of judgment and objectives by ideology or other sectarian factors. I was surprised in 1968 at the request that I recommend teachers not according to ability but according to race and political orientation. The dissolution of

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the sense of community proceeded so rapidly that I was not surprised in 1970 to find the American Historical Association Council suggest that nominations take into account "age, sex, ethnic background and employing institution." Hence the crisis, which comes not by assault from without but by decay from within. The need to reexamine objectives may be cathartic and salutary; or it may reveal a deep-seated malady. But the consequences of pretending it does not exist will certainly be fatal.

Part of the change is the product of sociological forces that have expanded the numbers, altered the status, and modified the position of the historical profession in the academic world, in the publishing business, and in society. I do not underestimate the importance of these factors but I prefer to concentrate here upon another aspect of the transformation, the intellectual pressures emanating from within that have fragmented the discipline, loosened its cohesive elements, and worn away the consciousness of common purpose. These pressures, which have blurred accepted guidelines and values, are at the root of this crisis.

The strategic location of history in the world of learning was secure in the 1930s. That world was worldwide, small enough so that everyone, more or less, knew his colleagues everywhere. Although travel was less frequent and more strenuous than it was to become later, contact among historians and across national boundaries was firmer than now. Furthermore, the process of defining the profession that began in the late nineteenth century had been fortunate in outcome. History was a social science, linked in the structure of universities and in academic practice with economics, political science and sociology. But it was also one of the humanities, linked as well with literature, fine arts and philosophy. The dual aspect was visible organizationally in the place the American Historical Association held on both the Social Science Research Council and the American Council of Learned Societies. More important, the dual orientation was evident in the substance of what historians actually did.

History in the United States was a social science, one of the group of disciplines that gave professional form to the study of the life of man in society. But its practitioners, regarding them-

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selves as custodians of the record of the human past, believed that their role was distinctive. Economics, sociology and political science treated institutionally distinct subject matters in a fashion that was basically analytical; history was a foundation for them all. It was the laboratory that churned out data and supplied information from which subsequent generalizations would arise, and that, at the same time, tested the hypotheses formulated by the analytical scholars. The importance of this role was evident in *The Encyclopedia of the Social Sciences,* edited by E. R. A. Seligman (1930-1935), which, in sharp contrast to its successor, drew historical materials intimately into the whole fabric of presentation. *A Charter for the Social Sciences,* a report produced under the auspices of the American Historical Association at about the same time, articulated the same point of view. This document, which was to have been a point of departure for subsequent generations of work, proved ironically a memorial to the wishes of a generation that was passing on. But it showed the strong anchorage that held history to the social sciences.

The association had special importance within the line of scholarly research with which I identified. In the United States since the turn of the century, the search for a new history that would break away from the institutional rigidities of the old had drawn Arthur M. Schlesinger, among others, to a definition of the subject encompassing every aspect of human behavior and aimed at a unifying formulation that would establish the connections among politics, economics, religion, the family and ideas. A parallel tendency in France led Lucien Febvre and Marc Bloch in a quest for *synthèse historique,* for the products of which their journal *Annales* provided an outlet. In this context, history was, at once, a body of knowledge important in itself, a means of establishing the linkages among the social sciences, and, by way of the generalizations it supported, an instrument useful in the definition of current policy.

Individual efforts were therefore parts of a larger process of cumulation. A scholar was conscious of his ties both to those who had taught him and to those whom he would teach. If he could see farther than his predecessors, it was because he stood on the shoulders of giants. And it would be a measure of his own growth

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that those who stood on his shoulders would see farther than he. History was subject to the same beneficent laws of improvement as were the other sciences, and the individual's merit lay in involvement in it. This conviction was so thoroughly part of the assumptions of my generation that I could hardly believe it when one of my students of the next generation asked me whether a critical comment would offend my teacher Arthur M. Schlesinger. It seemed to me supererogatory to explain that it was a normal expectation of scholarship to renew itself by later work.

Yet, although historians viewed themselves as participants in a scientific process that new information and insights kept in constant flux, they enjoyed an offsetting prop to the ego in the consciousness that they were also practitioners of a literary art. They stood in a tradition that antedated the science of history, that went back through Francis Parkman to George Bancroft and Thomas Macaulay and, indeed, to Thucydides. So that the hope of still being read tempered for many the consciousness that passage of time would inevitably supplant their works as science. They had, that is, the best of both worlds—or thought they had.

To appraise the outcome of these faded expectations, it is necessary to abandon the conventional stratagem of science that interprets every change as improvement and that uses past errors not as cautions of future fallibility but as evidence of present superiority.

The judgment of history as a literary art is the easier to deliver. The average effort requires little comment; it bears the impersonal marks of a competently edited clinical or laboratory report. The best contemporary writing within the genre deserves more attention. It is clear, and it is sometimes amusing, but it is usually frozen in patterns inherited from the past, sometimes actually in antique idiom. The reviewers' conventional term of approval is "readable." By whom? Actually, the word usually means "undemanding," so that it is praise to say of a book that it is easily read or skimmed. The language structure comes intact from the nineteenth century except insofar as the influence of journalism has simplified it.

Now there were great writers among the nineteenth-century

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historians. But there was a congruence between the styles of Macaulay or Parkman and the modes of expression of their contemporaries in fiction or poetry. The style of each was distinctive but Macaulay shared the language of Carlyle and Thackeray just as Parkman shared the language of Lowell and Melville. No such congruence exists today; the historians have locked themselves apart from the changes that have transformed the English language since the time of Joyce, Eliot and Pound.

Dead style is not just a matter of external form. It is related to what the historians have to say. We do not demand of Faulkner or Pound that they make easy reading because we know that intricacies of exposition, obscure allusions, and unusual diction are the means of communicating complex ideas. Do historians never feel the same need? Are there no complexities in the development of institutions, in the action of culture upon personality, in the operations of contingency, past as well as present? We enjoin ourselves repeatedly to extend the human experience by a display of imagination, empathy, and the ability to understand situations and characters other than our own, that is, by precisely the same qualities needed by any writer; yet without boldness of artful literary expression, we fall back upon the bland language of the weekly newsmagazine and remain insensitive.

Imagination and empathy are personal qualities. They call for the involvement of the writer—including the historian—with his subject. They call for icy passion, not always in accord with the methods of science that pull the investigator toward detachment, toward an impersonal, uninvolved stance. The historian is thus subject to the tension of a choice, as it were, between learning the language of English prose or of fortran. By pretending that there was no need for choice, by grossly underestimating the difficulty of either task, three generations of historians resolutely shut their eyes to problems we still face and for which we are less prepared than they were. No advice was ever easier to give than to occupy both stools; its plausibility explains in part our present sprawling posture.

The discipline has also fallen far short of fulfilling the scientific aspirations of the 1930s. It is no simple task to equip a

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historian today. The checklist of requirements for his preparation is long and growing—and more honored in form than in performance. The task of training the historian is not made the easier by casual curtailment of the course of preparation to raise productivity measured in the number of degrees granted.

In part, the difficulty of equipping the historian springs from the methodological and conceptual dependence of history upon related bodies of knowledge, a dependence frequently explained by the excuse that the discipline had only recently acquired the attributes of a science. As great a historian as Marc Bloch sounded the familiar lament: "This newcomer in the field of rational knowledge is also a science in its infancy." I do not know by what standard of chronology history is more youthful than political science or sociology, but I suspect that the infant-science argument, like infant-industry or young-nation pleas, conceals inner insecurities and self-doubt. If only we were mature enough to handle the big tools, then the difficulty of managing the pen might be less oppressive!

The hankering after new methods—to be supplied, it was hoped, by the other social sciences—is not recent. Twenty-five years ago historians were already turning to Weber, Michels, Sorokin, Mannheim, Durkheim, Freud, Schumpeter, Pareto and Keynes for guidance. The search for the saving social science reaches back from the present beyond Beard and Carl L. Becker at least to Turner's clutch at Achille Loria.

I share the longing of my colleagues, past and present, and more, I have not merely talked about those methods but have actually turned my hand at their use. The gains are almost self-evident, the losses almost imperceptible, but real.

Who will deny the beneficence of the computer? Certainly not one who spent months laboriously transcribing 43,567 entries from manuscript schedules, hand-sorting and finger-counting them. I bless the new hardware and software, the programs and printouts, the data banks and shared-time devices that ease the tasks of computation. Gladly have I signed the vouchers! But I cannot strike the balance of the results, for losses as well as gains have followed from the effort to harness quantitative methods to historical investigation.

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Take account of some of the elements. At worst, we find elaborate ways of telling time by algebra. More generally we encounter studies that make modest contributions to the understanding of problems posed by examining conventional sources. Quantification at this level involves classifying and counting; and technology makes the task more expeditious but demands no shifts in conceptualization. The years that separate Crane Brinton's *The Jacobins* (1930) from Charles H. Tilly's *The Vendée* (1964) have increased methodological sophistication but have brought no substanial alteration in point of view. Here I refer to techniques, not substance, for each of the books made useful contributions to the understanding of the French Revolution.

More elaborate techniques than these are also valuable. Certainly they add precision to many statements formerly left shadowy. But I cannot wholly agree that historical problems that hinge on the question "how many?" are always better solved by numerical answers. The more precise statement is not always the more accurate one. In 1813, John Adams tried to estimate how many colonists were for independence and hazarded various guesses—nearly equally divided, a third, five to two. It would, no doubt, be more precise to be able to say thirty-nine percent were for, thirty-one percent against, and thirty percent neutral, or to plant a good solid decimal point with a long series of digits behind it. But it would be less accurate to do so, for the data does not support that degree of refinement; and, indeed, the Adams statement itself I believe to be less accurate, given the present state of our knowledge, than a still vaguer partitive formulation: *most, some, others*. Every effort at quantification, in the end, operates within the parameter set by the limitations of the observed data, and the more venturesome the attempt, the greater the risk of slipping over the edge. Which is no reason for not taking the risk, but is a warning about the precautions necessary in doing so.

The historian who moves unequipped into these strange territories is at the mercy of interpreters, and surrenders his freedom to judge what is and is not feasible. We have long known the danger of depending on translators; we must now learn the danger of depending upon programmers. I have seen the products of research swirl out of control, and a work that started to deal

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with one subject turn into something altogether different—better or worse—as the remorseless printout carried the scholar where he had no intention of going.

There is another peril. The mounting piles of printout raise a barrier between the author and his subject. We know that numbers are not people; aggregations suppress particularities, and, in gaining what we can about the sums, we lose something about the constituent integers. In the dreary process of copying and sorting, I got to know my forty-three thousand Bostonians—where they lived and how they worked—with an intimacy Sam Warner could not match in his excellent study of Philadelphia, for he dealt with the residents of wards and I with the residents of homes, and, while he was able to do some things I could not, he was not able to do others that I could.

And often in the end, after the calculations are in, we still revert to a literary issue—the choice of adjectives. I watched closely and with admiration the manner in which Stephan Thernstrom handled the highly complex technical problems involved in estimating the rate of social mobility in nineteenth-century Newburyport. His conclusion seemed to me sound, although I was amazed to learn that so many sons of unskilled laborers moved upward in occupation. Some years later, however, I was still more amazed to see historians whom I respect use the same figures as evidence of how few moved upward.

Now the precise number had receded from my consciousness; but I wondered what difference it made. Suppose it were twenty-two percent; one could write *only* twenty-two percent or *fully* twenty-two percent with equal plausibility. Or if it were seventy-eight percent, one could still say *only* or *fully*.

Of course, if this number were one in a series, we could make a different kind of judgment—*more* or *less*. And Thernstrom did gather up nine other estimates, produced by varying methods and covering various areas at various times. But the evaluation still depended on the mastery of material external to the quantitative data.

Theory at this juncture is a useful crutch. A fully articulated and well-agreed-upon theory of social mobility might supply models against which to match particular findings. Theory might

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also suggest means of compensating for the deficiencies of data, as it did for Alfred H. Conrad and John R. Meyer in their study of "The Economics of Slavery in the Antebellum South." But even if the appropriate theory is at hand, the historian must then know it well enough to judge the fit to his own evidence and to his own sense of the particular situation.

To add to his obligations, we are now told by Professor Robert W. Fogel and others that the historian must also take account of counterfactual propositions. To judge the consequences of railroad development, we must estimate the results that would have followed from building canals instead; and his own probings in that direction I find stimulating. Indeed, it would be possible to extend the number of counterfactual propositions indefinitely. Suppose a strong federal authority had insisted that there be one Boston-New York route, not four? Suppose the first railroad corporations had been authorized, as the turnpikes were, to maintain the roads for the use of competing common carriers? A great mass of computation would follow, of which the historian would have to take account, but which would not solve his problem. Alas, his task would still be to explain how and why the railroads developed as they did.

The quantitative techniques make the greatest display and account for the most lavish grants. But they are not alone among the weapons in the historian's armory. Other varied instruments have long stood in the corners, for their popularity seasonally waxed and waned through the decades. It is good to see the rediscovery, if not the fully successful use, of the techniques of historical demography, too much neglected since they served A. M. Carr-Saunders, R. R. Kuczynski and D. V. Glass in the 1930s. It would be better if one could be sure that old mistakes were not being repeated in new forms.

Geography, on the other hand, has largely receded from the historical consciousness in the United States despite the recent valiant efforts of Harry R. Merrens and Raleigh A. Skelton and other practitioners of that discipline. Even the renewal of interest in urban studies has not recalled attention to the leads of Pierre Laveden, left unexplored since his day.

A minor revision of terminology, and we find ourselves among

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the behavioral sciences, confronted by psychology. There is no need to repeat here what was so forcefully stated a few years ago in William L. Langer's thoughtful presidential address about the importance for historians of the techniques and concepts of psychology. Indeed, similar pleas reached us decades earlier, although in less sophisticated forms than now. But it is far easier to make than to implement such suggestions, for more is required than a simple plastering over of gaps in the evidence with patches of theory. Dependence upon the concepts of Erik Erikson or R. D. Laing will provide no more support in the 1970s than Freud did in the 1920s. The need exists; it long has. The tools of analysis deserve careful study; they long have. But efforts to treat the data of the past with them have not commanded confidence. Note, for instance, the bitter controversy that followed upon a recent diagnosis of the illness of George III. Or William C. Bullitt's Wilson. Or the first volume of David Donald's Sumner or Stanley Elkins' Sambo. Or the challenges that should have greeted the facile generalizations in Michel Foucault's history of insanity. Or what is said and left unsaid about the emotional and other nonrational aspects of human behavior in the past.

I am far from having exhausted the list of techniques we have either neglected or misused. Erwin Panofsky and Francis Yates, in their own fields, have demonstrated the illuminating potentialities of iconography; but we have hardly begun effectively to exploit the mass of materials of the past three centuries. As a result, the crude conclusions that offset the useful insights of Philippe Ariès, who blundered upon some of these materials, meet with uncritical acquiescence. An occasional essay like Carl Schorske's on Vienna makes analogies with music; but I had to go back to Wilhelm Dilthey's work of more than seventy years ago for a serious effort to use the content of music as evidence of the experience of those who created or listened to it.

We have been deficient also in the way in which we use the rudimentary units with which we work, words. In the past half century anthropologists, linguists, philosophers and literary critics have devoted sustained attention to language and its surface, symbolic and hidden meanings. Yet the currents of thought generated by Bertrand Russell, I. A. Richards or Claude Lévi-

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Strauss have not perceptibly altered the way in which historians look at documents or analyze texts. In a different, although somewhat related, field we may have retrogressed in the past three decades; we have gone no farther now in the history of ideas than did A. O. Lovejoy and Perry Miller in this country or Friedrich Meinecke and Ernst Cassirer in Europe.

The mere multiplication in the number of tools at his disposal has not therefore helped the historian. While he hastily learns to use one, others rust neglected; new models constantly appear, and the old have scarcely paid for themselves when they are obsolete. Imagine the frustration of a scholar trying to use now the statistics or psychology he learned in the 1930s, if he did not really keep up with change in those fields; and if he did, how the process of doing so would have eaten into the time for his other work.

Of necessity, consequently, insofar as history claimed to be a science, its sole instrument for advancing knowledge was the monograph. However productive of insights the analytic essay or the discursive narrative might be, only the monograph on a defined and necessarily circumscribed subject afforded the scholar the medium for assembling, evaluating and weighing the total evidence yielded by his research. This was the only available counterpart of the experiment or the controlled observation on which other disciplines depended.

In traditional fields with a canon defined through the decades or centuries, monographs fall within a mosaic that provides a standard for assessing their contributions. The *kriegschuldfrage*, the French, American and English revolutions, monasticism—such issues tolerate both alterations of detail and broad efforts at continuing reinterpretation. Even the intrusion of nonspecialists sometimes has beneficial results, for the mobilization of resources to beat back novelty requires at least an effort at stocktaking. In Europe the small number of scholars and strict professorial control over students' subjects limit the consequences of fragmentation. But in subjects without defined boundaries or questions, and particularly in the United States, where numbers are large and where tutelary controls scarcely exist, monographs spin in space without reference to any particular orbit. Even the most impressive do not

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touch off chains of investigation to verify, extend or amend the interpretations advanced. After six years in the one case and eight in the other, we still have no comparable studies against which to test Thernstrom's conclusions about social mobility in Newburyport or Warner's about the suburbs of Boston. Can we hope to do better with recent analyses of the demography of Andover or violence in the Kansas cattle towns?

The discontinuity of research—the fact that the questions raised and answers given fail to stir the attention of historians other than their authors—enlarges the dangers of specialization. The distension of knowledge and the academic organization of American and, increasingly, all universities make some degree of specialization unavoidable, as does the growing complexity of techniques. We now have specialists by country and by period, with lines becoming ever finer, and also by method employed and subject treated. Even to be a generalist now is a kind of specialty, as if there could be a breed apart working not intensively on a narrow subject but spread thin over a broad area. We approach an ideal in which each scholar rules a little domain without concern for what happens over the fence.

Unhappily the subject is not so readily divided; the important developments insist on crossing boundaries, not only of time and space and language, but also of techniques and systematic analysis. We cannot be intellectual historians without occasionally needing to know about demography or agriculture. Or economic historians without knowing something about law. The tendency toward specialization more seriously than ever inhibits the search for connections, for the synthesizing aspects, highly valued in the 1930s.

We have long attempted to offset the damage done by discontinuity and specialization through conferences, sponsored research, serial publications and other devices to encourage teamwork or collaboration, or at least through comparative studies to focus attention on common questions. These devices have not worked. I do not say that they cannot work or should not work, but they have not, and I speak not only from experience, but from reflection on the evidence of others. I looked recently at the list of Needs and Opportunities for Research prepared by a committee of the

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American Historical Association in 1932. It was a good list. It still is. The needs and opportunities still exist, most of them still virgin territory. In fact, joint efforts now are more difficult than they were seventy years ago; compare the tasks of A. B. Hart in readying the American Nation Series and Lord Acton, the old Cambridge History, with those of their more recent successors. Moreover, the assumption that nationalism would cease to exert a divisive influence upon the discipline turned out to be utterly naïve.

To compound our difficulties we stagger beneath a burden, bequeathed by our intellectual progenitors, of making ourselves useful in the solution of society's ever-changing problems. Allied to the analytical social sciences with their commitment to questions relevant to current policy, historians felt both internal and external pressures to refocus their attention with every change in the headlines. One *unintended* result was a massive maldistribution of manpower. The historians of the 1930s emphasized the primacy of scholarship and denied the obligation of the scholar to take account of "the possible applications of his findings to practical affairs." They intended to "cover the wide world and all time with their searchings." Nevertheless, their emphasis on the discipline as a social science diverted disproportionate energy into the study of the recent past and of the United States. A second result was a faddishness in the subjects that attracted graduate students, with alterations in taste as radical and as frequent as those in clothing, and the discontinuities more abrupt than ever.

Hence the disarray of the discipline. Learning like power is susceptible to infeudation and, in the one case as in the other, to abuse. The most serious is the decline of craftsmanship. With every historian free to putter in his garden to his heart's content without interference or criticism, with many of them engaged in areas in which the evidence is partial and the rules for its use imperfect, it often seems not really to matter how sloppy the job is. I speak here not of the complex problems of interpretation but of the simpler ones that involve the verification of statements of fact.

I do not have a reliable index for measuring the precise fre-

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quency of error over time; I offer only an impression, and not proof, but illustrations. Furthermore, I do not wish to imply that I consider myself to have been free of sin. Indeed, having written more than most, I have no doubt that I have probably committed more errors than most. No one knows better than I the mischief that occurs in the transfer of a name or number from the source to the note, thence to the holograph copy and on, by way of successive typists and compositors, to the printed page. I address myself not to such human failings but to an attitude that treats the fact either as irrelevant or as susceptible to manipulation toward an end dictated by some more general logic.

The first illustration is personal. Shortly after my return to the United States in the fall, I noted the review in which Robin W. Winks hailed David Hackett Fischer's *Historians' Fallacies* as an important book, perhaps the most important to have appeared in recent years, in terms of helping an entire generation of scholars who profess to have lost confidence in being historians. Not these laudatory phrases, however, but a reference to my own work caught my attention. In due course, therefore, I turned to the book's index and then to the pages referred to, where I found a discussion of *argumentum ad nauseam*. Nauseating was the proper word. The utter stupidity of the comments was not surprising. Nor was the fact that they showed no evidence that their author had read any of the books alluded to. But I was shocked that he could not copy the titles correctly. I do not suggest that he should have looked at the title pages on the chance that some riffling of the pages might have offered him a clue to the contents, although he might thus have refrained from citing as my work a UNESCO symposium of which I was *rapporteur*. But it would have been a matter of simple prudence in laying about at antagonists, some of whom have a modicum of polemic skill, to keep a guard up. If he chose instead to stride unzippered into battle, it was because the mere matter of accuracy was less important than getting graduate students "chortling over one passage or another in the stacks" (Mr. Winks's terms of praise).

Taxed with these errors at the December, 1970, meeting of the American Historical Association, Mr. Fischer offered to correct the titles. But he did not offer to read the books to which

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he had referred or to examine the accuracy of the statements he made about them. Christopher Lasch, who shared the same platform, was more prudent; he did not this time argue that misquotation did not matter, as he did in 1965 when a perceptive reviewer exposed the careless blunders in *The New Radicalism in America, 1889-1963*. I hope that his silence was a token of acquiescence, in principle at least, with the basic proposition that there can be no scholarly discussion of any broader matter until there is agreement—total, unqualified and unconditional—on the ineluctable and binding quality of the data.

Softness on this issue conforms to other manifestations of the decay of professional standards—the decline, on the one hand, of the quality of documentation and, on the other, of critical capacity, the assignments undertaken and never completed, the grants accepted and never complied with, the shifty letters of reference and the equivocal evaluations.

The profession, Peirce's community of investigators, has failed to do anything to halt the erosion of standards. I am not suggesting that a few good, juicy public scandals would be desirable; I am suggesting the need for the internal discipline that arises out of accepted standards of practice and malpractice and out of the tokens of recognition that provide guidelines to the aspiring. We lack those standards or guidelines as long as a notice in the New York *Times* or the *New Yorker* is more important in establishing a career in history than a review in the *American Historical Review* or the *Journal of American History;* as long as promotions and appointments rest on strategic or ideological considerations rather than on merit; and as long as prizes are awarded according to the caprice and prejudice of judges rather than as recognition of excellence.

A recent ingenious essay has informed us of the death of the past. "The strength of the past in all aspects of life is far, far weaker than it was a generation ago," says Professor J. H. Plumb. "Indeed, few societies have ever had a past in such galloping dissolution as this." The obituary is premature. Although it may no longer serve the particular purposes he ascribed to it, the sense of the past is as live as ever.

I thumb once more through John Fowles's *The French Lieu-*

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tenant's Woman. What conceivable merit earned it a place on the best-seller lists of two countries I do not know; but certainly a considerable element in its popular attractiveness was its antique *décor*—the sense of distance from characters and setting, which also repeatedly crops up on today's stage and screen, and in all the aspects of contemporary culture devoted to "camp." Nor, I believe, would an examination of the rhetoric of the last two decades reveal that the past has ceased to be a source of myths—although the myths now current differ from those Professor Plumb describes, and they certainly sway broader sectors of the society. Indeed, his moving peroration may itself be read as a plea for another/different/better/newer myth. On quite another level, also, it is surely significant that the analytical social sciences, which a generation ago were content with static models, now increasingly seek a time dimension.

I agree with Professor Plumb in perceiving an inverse relationship between the past in his sense and history. Only, while he finds the one dead and the other strong, I find the one still vigorous and the other weak.

The crisis in history is the result not of the death of the past but of its misappropriation. Its negligent guardians have lost command. Confused by new gadgets, internally divided and distracted by the racket outside, they have allowed their subject to slip into the hands of propagandists, politicians, dramatists, novelists, journalists and social engineers. I wish that I could share the easy, unreflective optimism of the introduction to the Winter, 1971, issue of *Dædalus*, "Historical Studies Today," the editor of which delivers the casual judgment that "professional historical investigation is flourishing, and is as robust as it has ever been." That more people now earn a living by calling themselves historians consoles me not at all. That as much good honest work as ever, or more, may be getting done consoles me only slightly more, for the obstacles to identifying and learning from the first-rate product in any field are more formidable than before.

Mostly I draw comfort from the reflection that whatever may happen to the community of investigators, the historian, when all else is stripped away, remains a creative individual.

Of that I remind myself daily when I pass the ancient dicta-

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phone, vintage about 1936, that stands at the entrance to my office. The first such instrument I acquired was a castoff discarded by one of the deans in 1950. I well recall my first essay in creation by way of this medium. Having carefully read the instructions, I extracted from its protective case a clean wax cylinder which I mounted on the roller. I connected the feedline, threw the switch, adjusted the needle, and pressed the release pedal. Nothing happened. I checked all the connections; still nothing. Something was missing. It then became clear to me that however ingenious the equipment, it would not work unless I had something to say.

The historian will not find it by borrowing tools or slogans from scientists or propagandists, from the wielders of power or those who seek to gain it. He will find something to say as a historian only through the creative tension that arises from exercising the full power of his imagination and understanding against the unyielding evidence that survives the past. He can continue to do so as an individual even if the crisis in the discipline should leave him without a community of investigators of which to be part.

In my youth I feared the fate of the dusty little men in dusty little rooms, who hoarded up the dusty little learning no one valued. Hence, I wished to believe that a net of connections with what had gone before and what would follow would support my book in the open air.

My fears now fasten on a more grotesque image—a super, super, super market, in which shiny, shiny men stock the endless shelves, indiscriminate, inarticulate, each to his own pitch—and about the boxes' contents, no questions asked. Hence, I try now to read and write each book as if it stood totally alone, following nothing, with nothing to follow, its worth set solely by its own contents.

The crisis may pass and chaos may prove to be the present appearance of new forms sturdier than any of their predecessors. The historian may nurse that much hope. But he must not confuse wish with reality, and he cannot pretend to be one of a community that no longer exists.

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J. Goldsborough Bruff

(*In the winter of 1850*)

ROBERT WATSON

Abandoned in the black unmapped unknown
Sierra Nevadas, my tent poles bend
With snow, so hungry I could eat my dog.
Instead of gold I dream of Indian
Stew. Nevada, pup, I wouldn't eat you.
You're too small. You'd make only one poor lunch.
The deer, the immigrants disappeared with snow,
All down the mountain. I am here alone
With wolves, ravens, grizzly bears. I am sick.
I live on venison-bone stew, with luck
A rare raven potpie. Under the snow
If I can find it, if I have the strength
To walk, is a dead ox that I can eat.
My head aches, I have fever, hemorrhoids, sores
Open all over my body. The smoke
From my small fire chokes me, blinds me,
Yet in Washington platters heavy with food,
Logs blazing on the hearth, my children there,
I was dying of content. It was in
Dreams that I lived: The King of California,
Gold gushing molten from my mines' mouths; wagons
And ships heavy with ingots. How to live?
It was as if the wind tumbled me westward.
A tornado. I told lies to my wife.
"We will be rich," I said. And all along
I saw the flash of round plump gartered thighs,
Or black eyes of Indian girls I'd have.
Or sitting around the fire broiling buffalo

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I'd shot, singing under the stars. All dreams!
We just took off like robins in the fall.
I thought I drove when I was driven west.
Ask me why I am here, I cannot tell.

I dine alone tonight on candle ends
So hungry I could eat up my best friends:
They died of cholera, scurvy, arrows.
And when wagons mired or their oxen died,
They burned the grain, broke their picks and shovels
So no one else could use them, poisoned wells.
They robbed, shot friends, dug up fresh graves for loot.
What would I do now? What *wouldn't* I do now.
I am J. Goldsborough Bruff, President
Of Washington City Mining Company
In my winter palace. Addressing my dog.

Too sick to travel more, left here to guard
Our gear. My men and passing immigrants
All promised to return for me, bring me food.
I'm just 32 miles from Sacramento,
But now the deep snowdrifts bury the trails,
And bury what they were and what I was
Or thought I was, and buried my dream of gold,
The triumphal march to the lake of gold
Led by our glorious President Bruff.
How the men hated me. How I hated the men,
Falling asleep with whiskey during their watches.
And steal? They even stole my horse. And rape?
Indian women are ugly, such filth:
They are all a starving contemptible race.

Betrayed, Nevada, pup. Who are my enemies?
How can I curse the snow, the cold, the stars?
I have fallen lower than an Indian.
Could I have willed this end, frozen bones buried
In snow, my flesh down wolves' mouths? Map maker,

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How have I mapped my destiny? I have blamed
My men, I have blamed the snow, my own body,
These legs that won't walk. To be right in all,
And to fall to this. I have led my men
To doors of paradise. I am in Hell,
Alone where white and black are just the same:
Black sky, white snow frozen in darkness, me.

It's getting light. Nevada, up and out
Before the sunlight on the snow is blinding.
Up, if I can get up. Out, if I can. . .
I can. I walk like a man on stilts in snow,
My snowshoes are heavy as wagon wheels.
God give us game, give us firewood. Each way
I look, trackless bare white snow, bare black trees.
I press a long pole through the snow again
And again week after week, a lifetime.
The light blinds me. I am one ache from head
To toe, one running sore. My pole has struck. . .
What? Dig. Dig. I dig with my hands. I feel.
Do I feel the rough frozen hide of ox?
I scrape and shield my eyes from burning snow.
I press my knife with all my weight and cut
Into the golden flesh of ox. I will
Return to Washington, rich, well, honored,
J. Goldsborough Bruff, mapper of the unmapped
West. The gold dust will fall like snow, my pup.

✪ ROBERT WATSON, professor of English at the University of North Carolina at Greensboro, has published two volumes of poems and a novel. *Christmas in Las Vegas,* his third book of poems, will be published by Atheneum this fall.

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Celebration: Harlow Shapley

THE AMERICAN SCHOLAR is very proud of its long association with Harlow Shapley, who became a member of the Editorial Board in 1940. The two articles that follow do homage to this extraordinary man and great scientist.

Dr. Bart J. Bok places him where he belongs, alongside Galileo, Copernicus, Kepler, Newton and Einstein. Dr. Kirtley F. Mather presents the all-round man who found time to be and do many other things. In printing these pieces, we do not so much honor Dr. Shapley as ourselves. We have been among those fortunate ones who have seen, and known, a great man plain.

We are happy that Dr. Shapley continues to work with the SCHOLAR as Consulting Editor.

HIRAM HAYDN

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Harlow Shapley, Cosmographer

BART J. BOK

What Copernicus did for the Solar System, Harlow Shapley did for our Galaxy. Before the publication (1915-1921) of Harlow Shapley's famous series of nineteen papers, "Studies Based on the Colors and Magnitudes in Stellar Clusters," astronomers were generally agreed that our Sun was a star close to the center of our Milky Way System. By the early twenties, however, the time when I entered astronomy, there were few who doubted the validity of Shapley's basic conclusion, which is that our Sun is at a distance of thirty thousand light-years or more from the galactic center. It is significant to note that this great achievement was not the work of a group effort, but that it came about because a bright and inquiring young man was given the opportunity to work with the magnificent new telescopes, the sixty-inch and one-hundred-inch reflectors of Mount Wilson Observatory. Because of this one achievement alone, Shapley's name will forever be listed with the names of the great scientific philosophers, from Aristotle and Ptolemy through Copernicus, Galileo and Newton, to Hubble and Einstein. These are the names that, centuries hence, will figure in all introductory texts on the history of astronomy.

Harlow Shapley was born and educated as a country boy in Missouri. His scientific work was in the spirit of the expanding frontier and, while he listened to the lessons of the past, he was always independent in his thinking and he was a constant questioner of authority. He was fortunate in the teachers that guided his early steps in astronomy. Oliver Kellogg, Frederick H. Seares and Henry Norris Russell were the three who had the greatest influence on him during his undergraduate and graduate years. In 1911, a year after he obtained the Bachelor of Arts degree from the University of Missouri, he came to Princeton as the Thaw Fellow and only two years later he received the doctorate from Princeton University. Such rapid development is just unheard of in our present-day graduate schools!

On the day of his arrival at Princeton he became a student, an associate and a collaborator of Henry Norris Russell. In the following brief two and a half years Russell and Shapley worked out the theory for the analysis of light curves of eclipsing binaries, a theory that even today dominates analysis in this area. Through this work, Shapley became deeply impressed with the importance of the study of double stars. Not only did he manage to derive rough masses and distances for many of the stars he investigated, but he found their average densities and approximate linear diameters as well. Many eclipsing binary systems contain intrinsically very luminous stars, and Shapley was startled to find how low were the average internal densities of some of these stars when compared with the average densities in our Sun's interior. Throughout later life Shapley continued his interest in eclipsing binaries. Mrs. Shapley—Martha Betz Shapley—became an experienced and expert

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analyst of orbits of eclipsing binaries. She and Harlow collaborated closely in the early stages of his career. She continued with her work on eclipsing binaries for many years.

About 1913-14, Russell was giving full time to his researches relating to the famous diagram that is now referred to as the Hertzsprung-Russell Diagram. In this diagram, intrinsic brightness—absolute magnitude—is plotted against the spectral type, color index or surface temperature for each star. Shapley, while interested in individual stars, soon turned his attention to the problems of the structure of our Galaxy, a field in which Russell never showed a marked interest. During his Princeton days, Harlow Shapley studied the cepheid variable stars, which were at that time generally suspected of being a type of binary star. From Shapley's discussions with Russell there developed the pulsation hypothesis, a new theory to explain the variations in light, color and radial velocity for the cepheid variables. Shortly after his arrival at Mount Wilson Observatory (1914), Shapley completed a paper, "On the Nature and Cause of Cepheid Variation." The conclusion emerged that cepheid variables are probably not double stars, but that they are pulsating single stars. In modified form, the pulsation theory still holds sway.

How did Harlow Shapley become interested in globular clusters and the structure of our Galaxy? In his studies on the pulsation hypothesis, Shapley had found it necessary to pay very careful attention to the work of Henrietta Leavitt and of Ejnar Hertzsprung, who had found that the apparent brightnesses of stars in the Magellanic Clouds were related to the periods of light variations. This led to the establishment of the period-luminosity relation for cepheid variables. This relation suggests that, from the relatively easy determination of the period of light fluctuation of a cepheid variable, one can obtain information on the intrinsic brightness of the variable star. One reason why this was especially important was that the derived intrinsic brightnesses for many of the cepheid variables proved to be one thousand to ten thousand times as great as that of our Sun. The determination of the period of light variation for a faint cepheid variable, once discovered, is a relatively simple and straightforward affair. By calibrating the period-luminosity relation Shapley had found a way of using the faint cepheids as distant standard lamps.

Henry Norris Russell urged Shapley to study the cepheid variables, as he had urged him earlier to undertake the study of eclipsing variables, but Russell did not foresee the potential value of these studies for research on our Galaxy. Russell's primary interest was in the study of the physics of the stars, which, so he preached, would ultimately lead to knowledge about stellar evolution and star birth. It was Solon I. Bailey of Harvard who urged Shapley to get to work on the globular star clusters.

Bailey was an aristocratic astronomer in the great tradition. He was primarily an observer of variable stars and, working under the direction of E. C. Pickering, Harvard Observatory's famous director from 1877 to 1919, he concentrated in his work on variable stars and globular star clusters. Not only was he doing his researches from Cambridge, Massachusetts, but he became a most ardent observer of the southern heavens. Bailey did most of his observing from Harvard Observatory's southern Boyden Station, first in Peru, later (in 1925) in South Africa. Before Harlow Shapley left Princeton to go to Mount Wilson Observatory, he stopped for a visit (1914) at Harvard Observatory, where he met Bailey and discussed with him his future plans for research. Bailey advised him in simple and compelling terms to undertake the study of variable stars in globular clusters with the aid of the fine telescopes of Mount Wilson Observatory. Shapley followed Bailey's advice, and the rest is history.

It now seems perfectly natural that about 1914 someone with access to a large telescope should have elected to study the cepheid variables and their little cousins, the shorter period RR Lyrae variables, in globular star clusters. Shapley was the fellow with the good sense to have

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done so. The works of the great often seem trivial and obvious to the freshman in college fifty years later!

I wish that, even today, every young astronomy graduate student could be made to read Shapley's wonderful series of articles on globular clusters that resulted from his work during his years at Mount Wilson Observatory. I read them from beginning to end—and more than once—during my first year as a student at Leiden Observatory (in 1924), and they made a deep impression upon me. The series begins with some rather simple and straightforward observational papers, but gradually there emerges a wealth of relevant information on variable stars, on clusters and on colors and apparent magnitudes of stars in globular clusters. Shapley was forced to make certain side excursions, the most significant of which was the first attempt at the calibration in terms of intrinsic brightness (or absolute magnitude) of the period-luminosity relation for cepheid variables. Shapley also made an important first estimate of the mean intrinsic brightnesses of the RR Lyrae variables. These variable stars—often referred to in Shapley's days as cluster-type variables—are found in terrific numbers in some globular star clusters. Shapley found their average intrinsic brightnesses to be close to one hundred times that of our Sun. These RR Lyrae variables became Shapley's standard lamps in estimating distances to globular star clusters.

Before Shapley, astronomers accepted without much questioning the basic tenet that our Sun must be located near the center of the Galaxy. Shapley changed all that. The distribution in space of his sample of globular clusters with known distances showed beyond doubt that our Sun is far from the center of our galactic system. This conclusion should have been obvious for centuries from visual inspection of the Milky Way. If only more astronomers had traveled to the southern hemisphere to view the Band of the Milky Way in all its glory, we would not have had to wait for Shapley to teach us that we are located in a spot more than thirty thousand light-years from the center of our Galaxy!

It is difficult to realize now how audacious and unorthodox Shapley's approach seemed to the young astronomers of the early 1920s. Those of us who were at that time interested in the structure of our Galaxy were from the start imbued with a deep respect for advanced mathematical-statistical analysis. I, for one, had a great admiration for the intricacies of Gaussian integrals and I truly hoped that some day I might stumble on a solution that would give the world the one and only, definitive, mathematical form for *the* density function of our Galaxy!

Shapley's intrinsic brightnesses and estimated distances for the RR Lyrae variable stars and globular clusters were not accepted without challenge. They became the subject for fierce debate, especially in the early 1920s. When I was still in high school in The Hague, Holland, I was an avid reader of the semipopular magazine, *Hemel en Dampkring*. There were lengthy reports about Shapley's work and very well-expressed mixed praise and criticism of this work by Dutch astronomers, including the great Dutch Milky Way astronomer, J. C. Kapteyn. Kapteyn doubted the validity of Shapley's calibration of the period-luminosity relation, and he had little faith in Shapley's estimate of the distance of our Sun from the emerging center of our Galaxy. Among the first-year students at Leiden the debates about Shapley's work were vigorous and concerned, but in the end few doubts were left that Shapley was right.

In the United States there were at first very conflicting views about the validity of Shapley's arguments. George Ellery Hale had brought Shapley to Mount Wilson Observatory and under his directorship Shapley's most important work was done. In 1920 Hale arranged for a symposium at the National Academy of Sciences in Washington, with Shapley and Herber D. Curtis as the principal speakers. This Symposium on the Scale of the Universe is now often referred to as "The Great Debate," and it seems only right to think about it that way. I remember how excited I became about the debate when I read

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about it in my Dutch magazine, *Hemel en Dampkring*, and how, during my last year in high school in The Hague, I wrote a letter to the public library in that city, urging them to purchase from the National Academy of Sciences in Washington the full text of the Shapley and Curtis papers and the interchanges that followed. I told them that no public library would be complete unless it possessed on its shelves a copy of the Shapley-Curtis Debate!

Looking back at the debate, one sees that both Shapley and Curtis were right and both were wrong. Curtis attacked Shapley's new Scale of the Galaxy and his calibration of the period-luminosity relation. Shapley proved to be more nearly right on that score than Curtis. Shapley, however, was so impressed with the large dimensions of our Galaxy that he preferred to consider the spiral nebulae and other galaxies as satellites to our system, whereas Curtis took the view that these nebulae were Milky Way Systems in their own right. Shapley had an apparently good observational argument in favor of his hypothesis, since his close friend Adriaan van Maanen of Mount Wilson Observatory had reportedly measured small annual displacements across the sky in some of the spiral galaxies. If van Maanen's measurement had stood up under further scrutiny, Shapley's point of view might well have prevailed. We know now that van Maanen's measurements were erroneous. Hubble's work on the Andromeda Nebula and other galaxies proved that Curtis had been right about the spiral nebulae being truly external galaxies.

The Great Debate of April 26, 1920, had one important fringe benefit: among those in the audience was George Russell Agassiz, a close friend and adviser of President A. Lawrence Lowell of Harvard University. Agassiz came principally to look over Shapley as a candidate for the directorship of Harvard Observatory. Agassiz, whom it was my privilege to have known well, strongly advised in favor of Harlow Shapley's appointment and, after a brief interim period, Shapley became Harvard Observatory's director (1921). Shapley's researches at Harvard Observatory developed normally from his work at Mount Wilson Observatory, with the difference that he now had large numbers of observing and technical assistants, and also several associates who worked in lines parallel to his own. Important scientific contributions followed during the remainder of the 1920s and during the 1930s.

The most significant work accomplished by Shapley and associates during his early years at Harvard Observatory related again to the study of variable stars. Shapley developed an ambitious program for the search and study of variable stars in a large number of Milky Way fields. Especially important in those days were his researches with Henrietta H. Swope, which were concerned principally with the finding and studying of variable stars close to the center of our Galaxy. An improved value for the distance of the Sun to the center was obtained. Corrected for the effects of interstellar obscuration, this distance is now known to be a little over thirty thousand light-years. Shapley produced a good Harvard Observatory Monograph, *Star Clusters*, in the preparation of which he depended much on advice and assistance received from Helen Sawyer Hogg.

During his most active early period at Harvard, Shapley and his associates depended mostly on the large array of available small telescopes in marked contrast to his large-reflector work at Mount Wilson Observatory. But, most important for much of his work, he had now access to northern *and* southern hemisphere material.

The early Harvard days were marked by Shapley's entry into the study of the Magellanic Clouds. These two satellite galaxies to our own stellar system could only be observed from the far southern latitudes of Harvard's Boyden Station, in Arequipa, Peru, until 1927, and after that in Bloemfontein, South Africa. Shapley was for more than two decades the astronomer with best access to the Magellanic Clouds, and much important work on these galaxies was accomplished during his Harvard days. In one of his early papers from Harvard Observatory, Shapley derived a distance to the Small Magellanic Cloud that agrees

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with modern values if proper account is taken of the subsequent adjustment of the period-luminosity relation. Shapley inspired his associates to work under his direction on various aspects of problems relating to the Magellanic Clouds. In many ways Shapley considered himself the Cosmographer of the Clouds. (During his early days at Harvard, Shapley wrote a wonderful semipopular book, *Flights from Chaos*.) Cecilia and Sergei Gaposchkin became the most avid and successful observers and students of the variable star population of both Clouds. With Annie J. Cannon, Harvard's superb classifier of stellar spectra, Shapley prepared spectral distribution maps for the Clouds. His very effective chief associates in Magellanic Cloud work were Jenka Mohr and Virginia McKibben Nail. They directed the efforts of the many technical assistants. John S. Paraskevopoulos and his associates at Boyden Station in South Africa, notably M. J. Bester, obtained the thousands of photographs that were required for Shapley's work. The 1920s and early 1930s were truly great days at Harvard Observatory.

In the early 1930s Shapley became increasingly more involved in work relating to the distribution of galaxies. Shapley did prepare with Adelaide Ames a magnificent and still very much used catalogue of 1,249 of the brightest galaxies. He also did some impressive work on clusters of galaxies, notably on the Coma-Virgo Cluster. But his very extensive studies on the distribution and statistics of giant galaxies in the southern hemisphere were marred by insufficient photometric calibration, and the results of that work no longer figure prominently in astronomical literature. Shapley was also the first astronomer to have made extensive use of the term "galaxy" as distinct from "nebula."

In spite of his increasing load of directorial and political activities, Shapley remained active as an astronomer. To my mind one of the finest discoveries of Shapley's career was one he made in 1938. On a photograph made with one of Harvard's small cameras at Boyden Station he found indications of a swarm of very faint star images in the constellation of Sculptor. The examination of photographs of the region made with the twenty-four-inch Bruce Refractor at the Boyden Station proved this grouping to be a dwarf galaxy, showing thousands upon thousands of faint star images. Shortly after the initial discovery, a similar system was found in the constellation of Fornax. The further discovery and study of some RR Lyrae variable stars in these two galaxies gave distances that placed them within the Local System of Galaxies. Subsequent work, especially that of the Hale Observatory (until recently known as the Mount Wilson and Palomar Observatories) has led to the discovery of four additional dwarf galaxies within the Local Group. Six of the seventeen recognized member galaxies of our Local Group are now known to be dwarf galaxies.

In the period following the end of World War II, Harlow Shapley became more and more involved in nonastronomical affairs. He did some noble work for the world-at-large, and he played a key part especially in the establishment of UNESCO. His various activities outside the immediate area of astronomy are described well in Kirtley Mather's article in this issue of THE AMERICAN SCHOLAR. Astronomically speaking, the days of Shapley's great activity ended in the 1940s.

Of necessity my review of Shapley's scientific work has had to be a brief and a general one. His most unique scientific contributions were made during the first two decades of his great scientific career. As I noted earlier in this article, Harlow Shapley stands out as the astronomical pioneer of America's expanding frontier. We honor him as one of the truly great men who helped shape our thinking about the universe in which we live. We are all permanently in debt to his great accomplishments. He has contributed mightily to the Golden Book of Knowledge and his name will be known forever.

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CELEBRATION

Harlow Shapley, Man of the World

KIRTLEY F. MATHER

I have known Harlow Shapley since 1923, at first only casually, but since the mid-1930s quite intimately. I rate him at the top among scientists with sensitive and sensible social consciences who commit themselves to action designed to improve the welfare of mankind. It is a privilege, gladly embraced, to pay tribute to his activities as a citizen and humanitarian, and I leave it to his better qualified colleague to acclaim his achievements as an astronomer and astrophysicist.

Harlow came to Harvard University in 1921 to become director of the Harvard Observatory and Paine Professor of Practical Astronomy. He continued as director of the Observatory until 1952 and "retired" as professor emeritus in 1956. I joined the Harvard faculty as visiting professor of geology for the first half of the 1923-24 academic year and returned to the department of geology and geography on a permanent basis in the fall of 1924, continuing as professor of geology until my "retirement" as professor emeritus in 1954. Back in the 1920s we were among the small fraction of Harvard professors who were "barbarians," having come from the remote hinterland west of the Appalachians without benefit of any formal education at Harvard, either in the college or in a graduate school. Nor had either of us studied or taught in a British or other European university before joining the Harvard faculty. Times have changed since then; the percentage of "barbarians" among Harvard professors has increased by several orders of magnitude, and for some time now nobody has been surprised by the discovery that a new professor is not in any direct way a Harvard product.

Actually, both of us were warmly received in the Harvard community that has always stretched far out from the Yard into many parts of "Metropolitan Boston"—Harlow because of the renown accruing from his studies of variable stars at the Mount Wilson Observatory in California and I because of my name. My direct ancestor, Timothy Mather (1628-1684), was a brother of Increase Mather, the early president of Harvard College (for whom the latest Harvard House is named) and the father of Cotton Mather. Counterbalancing my genealogical advantage was the fact that Harlow had earned his Ph.D. degree at Princeton—within the Ivy League—whereas mine had been gained merely at the University of Chicago. Be that as it may, I am sure that Harlow found in 1921-22, as I did in 1923-24, that the rumors, common in the Midwest in those days, about cold, austere Boston brahmins and aloof, exclusive Harvard academics were completely groundless, perhaps largely engendered by inferiority complexes on the part of those who spread them.

In any event, Harlow lost no time demonstrating in his new environment that one of his long-continuing ambitions was to expedite the widening spread of scientific habits of mind throughout the entire body politic. The public lectures he presented in 1922 under the auspices of the Lowell

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Institute in Boston received wide attention and launched his career as an active proponent of what is now referred to as continuing education for adults. Throughout the next four decades, he addressed countless enthralled audiences, nonacademic as well as academic, in a dozen different countries. He spoke as a man of science to people with little or no scientific training. With great glee he told them, "Harvard Square is thirty thousand light-years away from the center of the galaxy that includes the solar system." Not only did he explain lucidly how astronomers achieved such measurements, he also suggested their meaning with regard to ideas about man's place in the universe. Listening to him was always a mind-stretching experience for his fortunate hearers.

What was probably for him the high point in this aspect of his career occurred in 1957-58, not long after his retirement from teaching duties at Harvard. Just at that time the United Chapters of Phi Beta Kappa were establishing a new program in which "Visiting Scholars" were to be sent by the national organization to colleges or universities sheltering its local chapters. In contrast to the hit-and-run schedule for the visiting lecturers of other learned societies, the Phi Beta Kappa scholars were to remain on each campus for a couple of days so that there might be several small informal meetings with students and faculty as well as a public lecture for the entire community. This was an ideal arrangement for Shapley, and as a member of one of the first panels of ΦBK Visiting Scholars he proved that this basic pattern for campus visits was superbly effective. The program has been carried forward in that way ever since, although no other Visiting Scholar has yet equaled Harlow's record of twenty-five engagements in a single academic year. It so happened that his first campus visits coincided with the launching of the first Russian sputnik in October, 1957, and he spoke everywhere to overflow audiences, attracted in part by the new interest in space engendered by that surprising event. One of the reports from a Phi Beta Kappa chapter was typical: "This distinguished scientist and humanitarian fascinated large numbers of our undergraduates, faculty, and townspeople. He stimulated the life of the mind on this campus and demonstrated that thinking can be an exciting experience." In less erudite terms but in characteristic fashion was one of Harlow's own reports, scribbled on the letterhead of a motel in Vermillion, South Dakota. It reads: "Wednesday I shall have two dinners—one plane, one Lafayette, also probably plain. Albion was a riot. This A.M. there were 40 sitting on the floor, 40 standing around the edges. I couldn't roll 'em in the aisles—no place to roll! It was my No. 5."

The same ebullient spirit enlivened his Harvard classroom, especially during the last few years before his official retirement when he offered Harvard and Radcliffe undergraduates a course on cosmology in the General Education program. That opportunity to penetrate the minds of students concentrating elsewhere than in the physical sciences with thought-provoking items of up-to-the-minute scientific lore was eagerly seized. It was a part of his long-continuing campaign to break down the artificial barriers between the sciences and the humanities and to strengthen the idea that science could be just as humane as any of the fine arts.

That same motive must have been influential much earlier when, in 1940, he first accepted election to the Editorial Board of THE AMERICAN SCHOLAR. He has continued to serve on that board for ten successive three-year terms. Throughout those years he faithfully attended the board's triannual meetings and provided invaluable assistance in solving fiscal problems as well as in decisions regarding editorial policy. In a somewhat similar vein, after serving as president of the American Academy of Arts and Sciences from 1939 to 1944, Shapley took the lead in transforming the erudite but sometimes stodgy *Proceedings* of that venerable academy into the quarterly journal, *Dædalus*. He not only proposed that singularly appropriate name but has continued as a member of its Board of Editors to the present time. Since 1958, *Dædalus* has had wide readership because of its lively inter-

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disciplinary approach to current problems and its successful integration of relevant ideas and information, drawn from diverse fields of intellectual activity.

Another sector in the Shapley campaign to make science better understood by Everyman involved the genesis and early development of Science Service, Inc., the "institution for the popularization of science" founded in 1921. Harlow has told the story in his inimitable reminiscences, *Through Rugged Ways to the Stars,* published in 1969. He has been an appointee of the National Academy of Sciences to the Board of Trustees of Science Service since 1935, and served as president of that board from 1945 to 1954. Due in large part to his active leadership, Science Service has played a significant role in the upgrading of "science reporting" to its present high level of excellence in the popular press. It also publishes its own authoritative weekly, *Science News,* conducts the annual Westinghouse Science Talent Search, and gives general supervision to the science fairs that have become important in the scientific education of the youth of our country. To all these activities, Shapley gave an amazing amount of time and energy.

Closely related to activities such as these that projected Shapley beyond the cloisters of academe were his efforts to strengthen and integrate the scientific enterprises within academic circles. I recall, for example, the important part he played in the development of the *Source Books in the History of the Sciences,* published under the auspices of the American Philosophical Association with the aid of a grant from the Carnegie Corporation of New York. Back in 1924, he was one of the first scientists recruited by Gregory D. Walcott, then professor of philosophy at Long Island University, for the Advisory Board to supervise the project, and he has remained on that board to the present. Shapley himself, with the collaboration of Helen E. Howarth, a member of his staff at the Observatory, produced the first book in the series, *A Source Book in Astronomy,* published in 1930, thus setting the pattern for the books in other sciences that followed. Much later, after Gregory Walcott's death, when another philosopher, Edward H. Madden, now at the State University of New York at Buffalo, was general editor, it was decided to produce a second series of source books covering developments during the half century between 1900 and 1950, inasmuch as the first series had dealt only with the period "from the Renaissance to the end of the nineteenth century." Again, Shapley blazed the trail; his *Source Book in Astronomy, 1900-1950* was published in 1960.

Shapley's commitment to the welfare of all the sciences was demonstrated in many practical ways. During many of the years between 1930 and 1960, he was simultaneously a member of the grants-in-aid committees of the Society of the Sigma Xi, the American Philosophical Society and the American Academy of Arts and Sciences, and at times was chairman of all three committees. The funds available for aiding scientific research from even those three relatively affluent organizations were never very large, but in those years a grant of only a few hundred dollars to a graduate student working on his doctoral dissertation or a youthful instructor inspired by a new idea made all the difference between success and failure. Literally hundreds of applications came in each year. Harlow spent long hours sifting and appraising them in terms of the applicant's ability, the significance of his proposed research, and what would now be called the cost-benefit of the project. Sometimes when one of his committees turned down a qualified applicant because the funds at its disposal were exhausted, he would persuade the committee of one of the other organizations to pick up the tab. There sometimes are advantages in having three hats to wear. Certainly there are today hundreds of well-established scientists with a wide variety of specialties who remember with gratitude the efforts of Harlow Shapley to provide financial assistance for their budding careers. For Harlow it was a work of love.

Similarly he served actively—not merely as window-dressing—on the governing boards of such institutions as the Massa-

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chusetts Institute of Technology, the Woods Hole Oceanographic Institution and the Worcester Foundation for Experimental Biology. The last is of special interest here, for its concerns would seem a far cry from those of astronomy. Actually, Harlow was the first president of its Board of Trustees, serving in that capacity from 1942 to 1948, and he is still an active member of that board. Although it was not astronomy, it was well within the ambit of this particular astronomer.

Shapley's continuing endeavor to insure adequate financial support for research in basic science of all kinds reached its peak of success with the establishment of the National Science Foundation in 1951. His account of events leading to the unprecedented action of the Congress whereby the United States government was committed to underwriting American science is tinged with gently cynical humor. I am sure that all concerned with that significant political action would agree that the major credit for its accomplishment should go to Harlow Shapley and Vannevar Bush.

During those same years, Harlow was also engaged in a campaign for science on an even wider front. When the United Nations organization was aborning in San Francisco in 1945, he threw all the weight of his considerable influence behind the proposal that provision for the United Nations Educational, Scientific, and Cultural Organization should be included in the Charter adopted there. In fact, it was Shapley who almost singlehandedly prevented the deletion of the "S" from UNESCO. Quite appropriately he was one of the official delegates from the United States to the first meeting of UNESCO in London in November, 1945, at which the guidelines were spelled out for what has proved to be one of the most successful international operations of all time.

The outreach into the international scene was nothing new for Shapley. Not long after he became director of the Harvard Observatory, he attended a meeting of astronomers in Rome where the leading Polish astronomer of the time asked him whether Harvard had any surplus telescopes that could be loaned to the observatory near Kraków to help replace equipment destroyed during World War I. Sure enough, Harvard did. A no longer needed eight-inch telescope was sent to the Polish observatory a few months later. Interestingly enough, near the end of World War II, the same Polish astronomer made a similar appeal on behalf of the famous observatory at Turin. Again Shapley (and Harvard) responded; another discarded eight-inch telescope was refurbished and sent to war-torn Europe. Shapley's comment was: "We can't have any more world wars because Harvard is fresh out of eight-inch telescopes."

At many other places and in many other practical ways, Shapley worked hard to strengthen astronomy and other sciences in foreign countries. Central in his concern was the training of men and women for research and teaching. Students were actively recruited from abroad for study in the Harvard Graduate School. Some were awarded scholarships, some subsidized by part-time jobs on the Observatory staff. Many were personally selected from the people Shapley met at the meetings of the International Astronomical Union, which he frequently attended, or were recommended by astronomers with whom he became well acquainted on such occasions. At the same time he did much to promote the support of science in countries like India and Mexico through his friendship with such national leaders as Pandit Nehru and President Manuel Avila Camacho. For example, more than anyone else he was responsible for the construction, equipping and staffing of the excellent astronomical observatory at Tonanzintla, Mexico.

Internationalist to the core, Harlow never forgot that he was an American. As such, he was well aware of the importance of voluntary organizations in a free society, both for the promotion of social welfare and for the protection of the rights of individuals. Thus, in the mid-1930s he associated himself with the Civil Liberties Union of Massachusetts and ever since has been a member of its Advisory Committee. Thus, also, in the mid-1940s he was a key

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figure in the founding of the Federation of American Scientists, intended specifically to make audible the voices of scientists in the political arena. For many years he was a member of the Federation's Advisory Council, and, from 1948 to 1953, his son Alan was its executive officer.

Reaching further out from his academic base, Harlow helped to organize the National Council of the Arts, Sciences, and Professions, and was its president for the few years of its existence immediately after World War II. This was an out-and-out political project; it raised money to support liberal candidates for election to Congress and held peace rallies in New York and other cities. It won for Harlow the antagonism of ultraconservative politicians and their cohorts. So also did his activities in connection with the American Association of Scientific Workers, organized in the late 1930s to bring together industrial technologists and academic scientists with the hope that more of them would accept social responsibilities beyond their laboratories and workshops, promote the applications of science to public welfare, and uphold the high ideals of international brotherhood in "one world." All this was at a time when many Americans were fearful that the United States was becoming a "social welfare state" and the world was plunging headlong into the cataclysm of World War II and toward its subsequent fragmentation into segments bounded by iron curtains, bamboo curtains and red-tape curtains!

Actually, one of the most notable operations of the A.A.S.W. was a contribution, albeit indirectly, to the war effort. Realizing that hundreds of thousands of American GIs would be spending long weeks of relative inactivity in transit across the wide Atlantic and even wider Pacific Ocean, the association produced a paperbound book for distribution to them. It was published in 1943 by Science Service with the title *Science from Shipboard* and by the *Infantry Journal* with the title *What To Do Aboard a Transport*. Shapley wrote the foreword; Bart Bok, then the number-two man in the Harvard Observatory, the chapter on "stars and nebulae"; and a dozen others of us the chapters dealing with our various scientific disciplines. Noteworthy also was Shapley's effective leadership—and the efforts of the A.A.S.W.—in pressuring Congress to provide civilian control over the nation's nuclear bomb production by establishing the Atomic Energy Commission in 1947.

Reviewing Shapley's political activities in retrospect and recalling the miasma of suspicion, fear and hatred that polluted the political atmosphere in the United States in those years, it is really not surprising that he was subpoenaed to appear before the House Committee on Un-American Activities in 1946 and cited by Senator Joseph McCarthy in 1950 as one of "the Communists in the State Department." Representative John E. Rankin, at that time a member of HUAC, threatened to charge him with contempt, but wiser heads in Congress squelched that idea; Senator McCarthy's false allegations failed to have any lasting impact. As though responding to Representative Rankin's smear, the American Association for the Advancement of Science elected Shapley as its president in 1947; and, a dozen years after Senator McCarthy's vituperative outbursts, the town of Carthage, Missouri, celebrated May 3, 1963, as "Harlow Shapley Day," in connection with which the Missouri Legislature adopted a resolution commending him.

One incident in this phase of Shapley's career deserves special note, especially at the present time when university administrators are under criticism for alleged failure to deal sternly with campus unrest and there is grave danger that a wave of anti-intellectualism will again sweep across our land. In his autobiography Shapley reports the episode briefly in a quasi-humorous vein, but the then president of Harvard University, James B. Conant, has recently given a full—and sober—account of it in his book, *My Several Lives*. During the academic year 1948-49, Frank B. Ober, a graduate of the Harvard Law School, wrote a letter to President Conant "protesting the attitude of Harvard toward extracurricular activities of professors 'giving

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aid and comfort to Communism' " and "announced his decision not to subscribe to the Harvard Law School Fund." Several letters were exchanged. The punch line is in a letter that Conant asked Grenville Clark, then a senior member of the Harvard Corporation, to write to Ober as one lawyer to another: "If $5,000,000 or any sum were offered tomorrow as the price of the removal of Professor Ciardi or Professor Shapley [the two whose extracurricular activities had incurred Ober's dislike] or of initiating the 'closer watch' that you recommend, nothing is more certain than that the Corporation would again reply that it cannot tolerate the suggestion." Conant closed this chapter in Shapley's life, so far as he—and Harvard—were concerned, when he told a group of alumni in June, 1949, that "as long as I am president of the university, I can assure you there will be no policy of inquiry into the political views of the members of the staff and no watching over their activities as private citizens."

Harlow's "controversial" involvement in political affairs stemmed from his strong humanitarian spirit. Although never a churchman, he was deeply religious at heart. His lecture tours were frequently interspersed with talks in churches and to religious organizations on or near college campuses. He thoroughly enjoyed long discussions and conversations about "science and religion." He often said that for him "God is Nature with a capital N," and that was quite sufficient to start a free-wheeling and often sparkling discussion on many a campus in the 1940s and '50s. For several years he participated in Rabbi Louis Finkelstein's widely known Conferences on Science, Philosophy, and Religion at the Jewish Theological Seminary in New York, and some of his papers were published in the proceedings of those conferences.

At least as significant are Harlow's activities in connection with the Institute on Religion in an Age of Science. He delivered one of the principal addresses at the first of the summer conferences held annually by that organization since 1954 on Star Island, ten miles out from Portsmouth, New Hampshire, served as vice-president and chairman of the Advisory Board from 1954 to 1960, as president from 1960 to 1962, and as a member of the Council from 1962 to 1969. At the Star Island conferences he not only presented an occasional formal paper but often was the moderator of the daily "Owl Session." This for him was a projection into the area of religion of the "Hollow Squares" over which he had long presided at the Harvard Observatory, and which were designed to foster impromptu discussions in the area of astronomy. Reaching out to a larger audience than the one that admired him so much on Star Island, he edited *Science Ponders Religion,* a collection of papers by various authors, based on material presented at the conferences. His chapter in the book, "Stars, Ethics, and Survival," tells much about his awareness of spiritual factors in the universe. Quite appropriately, the Meadville/Lombard Theological School, affiliated with the University of Chicago, honored him with its D.D. degree in 1969.

The foregoing record of Harlow Shapley's widely diversified activities is far from complete. Yet it is sufficient to raise the question: how could a man who gave himself to others so energetically and in so many time-consuming ways have time to enjoy his own family? The fact is that Harlow was indeed a family man in the richest sense of that term. His wife, Martha Betz, whom he married on April 15, 1914, has truly been his helpmate through all the busy years. Both of them had graduated from the University of Missouri in 1910, and while he was studying at Princeton for his Ph.D. degree, she pursued graduate studies at Bryn Mawr—not too far away for an occasional visit, I assume. During and immediately following World War II, she put her mathematical talent and excellent training to good use by compiling "firing tables and other mathematical tables" at M. I. T. for the Navy and Air Force. Harlow says, "she also helped manage the Observatory." His "pet name" for her is Gretchen. I never inquired as to the origin of that usage, but whenever he spoke to or about "Gretchen," it was obvious

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that the name had deep meaning and loving significance for both him and her. Now that he is in his eighty-sixth year and they have celebrated their fifty-seventh wedding anniversary, his health is not as good as hers. "Gretchen" continues to give him tender and expert care, faithfully compensating for his failing eyesight in every possible way.

The Shapleys have a daughter and four sons, of whom the parents are justly proud. Their home was in the "Observatory compound," and that environment reinforced the genetic heritage in influencing their commitments to the scientific and scholarly careers in which each has excelled. All are music lovers, and some are highly capable with their stringed instruments. Back in the late 1930s, Harlow's second son, Alan, played his cello along with my eldest daughter, Florence, and her viola in at least one of Cambridge's symphony orchestras. The house on Observatory Hill often overflowed with music and merriment, and Harlow aided and abetted it all. Their delightful summer home—now Harlow's "permanent residence"—in the village of Sharon, near Peterborough, New Hampshire, and not far from Mount Monadnock, was also famous for its hospitality. One of its remodeled barns is equipped with several small bedrooms and a dormitory so that there was plenty of room for Harlow's children and their numerous friends—and now for the grandchildren and *their* friends. Somehow, in the midst of all his busyness Harlow never neglected his family.

What should be said to sum up a tribute to such a man as this? I can do no better than echo Hudson Hoagland's words. "Those of us who have had the privilege of knowing Harlow Shapley have indeed been fortunate. It is trite to call him a Renaissance man, but it is hard to think of a better designation for his protean interests and contributions."

British Columbia

WILLIAM STAFFORD

After the border, it was trees all the way to
the end. When we talked to a native and
looked at his expression turned away, it was
trees. It was trees when anyone asked us
where we had been: land and land and land,
mountain by mountain, and everywhere.

We came to a lake so sudden that it
held a sharp outline in it, upside down:
the opposite shore offered us in the water.
And we waded in trees, drowned in them, held
there in the sky. I will never find enough
of the open again. I walk with my
family, carefully anonymous, hidden in trees.

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SIGHTINGS

Talking with Truffaut

CHARLES THOMAS SAMUELS

Last summer, in his office at Les Films du Carrosse, a company he founded and runs, François Truffaut talked with me for about five hours. Since neither of us is particularly fluent in the other's language, I put my questions in English, had them translated by a friend (Mrs. Françoise Longhurst, to whom all thanks are due), and Truffaut answered in French, which was translated in its turn. As our conversation progressed, growing rapport was signaled by moments in which each man understood the other unaided. Sometimes we turned out to have been overconfident about our comprehension, which made for cordial jokes. I have tried to capture Truffaut's characteristic vivacity and wit in the excerpts that follow, while also selecting a sample of the range of our concerns. In a much longer version, this interview will appear in a volume that I am editing for G. P. Putnam's Sons to be called Encountering Directors.

CHARLES THOMAS SAMUELS: M. Truffaut, with the exception of *Jules and Jim,* you usually adapt trash novels to the screen. Why?

FRANÇOIS TRUFFAUT: I have often been asked to film great novels—books like *The Stranger, Swann's Way, The Wanderer, Journey to the End of the Night.* In each case, my admiration for the book prevented me from making it into a film. *Jules and Jim* was an exception because it was so little known, and I wanted to increase its popularity by calling it to the attention of a large audience. However, despite what you say, I have never used a trash novel or a book I did not admire. Writers like David Goodis [author of *Down There,* the basis for *Shoot the Piano Player*] and William Irish [source for *The Bride Wore Black* and *Mississippi Mermaid*] have special value, and they have no counterparts in France. Here, detective-story writers are rotten, whereas in America writers as great as Hemingway work in that field. But because so many books appear each year in the States, these detective-story writers are usually ignored. Ironically, this liberates them. Made humble by their neglect, they are free to experiment because they think no one is paying attention anyway. Not expecting to be analyzed, they put into their books anything they choose.

SAMUELS: I hadn't thought of that. Therefore, they reflect life as a muddle—incomprehensible variety. You see life that way too, don't you?

TRUFFAUT: Yes. But let me tell you something. After seeing *Shoot the Piano Player* and liking it, Henry Miller was asked to write an introduction for a new edition of *Down There,* and therefore had to read the book. Then he phoned me to say that he suddenly realized that whereas my film was good the book was even better. So you see, I don't film trash.

SAMUELS: In an interview you gave the *Cahiers du Cinéma* you denigrate the deliberately difficult or subtle, but many of your films (above all, *Jules and Jim*) are

✪ CHARLES THOMAS SAMUELS' column on film appears regularly in the SCHOLAR.

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both difficult and subtle. Were you misquoted or would you now modify this assertion?

TRUFFAUT: No. The interviewers and I cooperated in that oversimplification. What I should do is distinguish between intention and execution. Take, for example, Joseph Strick, who decides to film *Tropic of Cancer, Ulysses* and Genet's *The Balcony* without being cinematically armed for the job. Were he more honest, he would attempt things for which he is better prepared: simple things. *The Rules of the Game* and *The Golden Coach* are very subtle films, but Jean Renoir, unlike Strick, didn't set out to be subtle; subtlety was an attribute of his character. When simple people attempt to bring subtle writers to the screen, the discrepancy between source and adapter always spoils the result. I much prefer Godard, who takes small novels and treats them in the manner of a great novelist. I have tried this, too. Both *Shoot the Piano Player* and Godard's *Band of Outsiders* try to give cinematic equivalents of a novel by Raymond Queneau, but neither of us would actually dare to adapt one of Queneau's novels.

SAMUELS: Like many American critics, I'm surprised by your admiration for Howard Hawks and John Ford. Would you explain why you like them?

TRUFFAUT: Originally, I didn't like Ford —because of his material: for example, the comic secondary characters, the brutality, the male-female relationships typified by the man's slapping the woman on the backside. But, eventually, I came to understand that he had achieved an absolute uniformity of technical expertise. And his technique is the more admirable for being unobtrusive: his camera is invisible, his staging is perfect, he maintains a smoothness of surface in which no one scene is allowed to become more important than any other. Such mastery is possible only after one has made an enormous number of films. Questions of quality aside, John Ford is the Simenon of directors.

Hawks, on the other hand, is the greatest cinematic intelligence among American directors. I did my interview volume with Hitchcock*; it would have been more important had I done it with Hawks. He isn't, like Hitchcock, a cinema addict, nor is he anguished or obsessed. Rather he loves life in all its manifestations, and because of this harmony with life in general he was able to make the two or three greatest examples of every genre of film (except perhaps comedy, in which you have Lubitsch, *et cetera*).

SAMUELS: M. Truffaut, Hawks' very versatility might be called an indication that he lacks a single vision of life or of cinema. Yet it is precisely that lack that you condemn in your French predecessors.

TRUFFAUT: But Hawks does have a vision of life and cinema! For example, he is the first American director to show women as equal to men (think of his handling of Lauren Bacall vis-à-vis Humphrey Bogart in *The Big Sleep*). He always knows what he is doing. When he decided to make *Scarface,* realizing the danger of a film about sordid mobsters, he instructed his script writer, Ben Hecht, to join him in constantly thinking about the history of the Borgias so as to give the film some tragic stature. It is to this that we owe the nearly incestuous love between George Raft and his sister in the film.

SAMUELS: Why do you dislike Antonioni so?

TRUFFAUT: First, for his lack of humor. He is so terribly solemn, so terribly pompous. I don't like the image he projects of himself as *the* psychologist of the feminine soul. When De Gaulle was trying to restore the confidence of the French in Algeria, he said, "French men and women, I have understood you." Antonioni stands like that and says, "Women of the world, I have understood you." . . . And he follows the fashion. That's why he was arrested the other day at the London airport with hashish in his shoe.

SAMUELS: No, marihuana—and it happened months ago.

TRUFFAUT: All right. But look, it is first of all unnecessary to put marihuana in your shoe because you can get it just as

* François Truffaut, *Hitchcock* (New York: Simon and Schuster, 1967).

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easily in London as in America. More important is the fact that four years ago he wasn't smoking marihuana but now he is. That shows his childish need to keep up with youth.

In fact, my hostility to Antonioni helped me to make *Wild Child*. One of the big themes today is the difficulty of human communication. This is very nice; it makes for good conversation among intellectuals. But when you come in contact with a family that includes a deaf-mute child, only then do you realize what lack of communication means. I wanted to show a real lack of communication in my film, not the modish variety that involves Antonioni.

SAMUELS: M. Truffaut, what do you think of *Z*?

TRUFFAUT: I think it's a good film that is more important politically than artistically. It was politically efficient because it reached people who were not pre-convinced. After seeing *Z*, the average man leaves the theater thinking that it isn't good for a country to be run by the military. Although the authors never claimed this, I believe the film had an influence on French politics. In an interview, I said that it contributed to the referendum that brought down De Gaulle. A pity it wasn't a stronger film; then we might have also avoided Pompidou!

SAMUELS: You generally avoid politics in your films; when it enters, you make fun of it. For example, in *Bed and Board* it's the prostitute who is political.

TRUFFAUT: That wasn't a joke. Usually politics are forced into a film because artists, in order to please their friends, make obligatory references. Yesterday, it was the Algerian War; today, Vietnam. But this is not artificial. This shows politics as it affects the people. So she says that formerly her customers stopped coming by the twenty-third of the month, whereas now they stop by the fifteenth.

SAMUELS: In short, they run out of money more quickly because of inflation.

TRUFFAUT: Exactly. But you know there are other references to politics in the film. For instance, when the concierge changes all the garbage cans from metal to plastic, he says the new ones signify the new society. The "new society" is a slogan borrowed from you Americans by Chalban-Delmas.

SAMUELS: I missed that thrust. But I do think that some people will be offended by the plot's predictability. All the events are so familiar.

TRUFFAUT: Yes, I suppose that makes *Bed and Board* weaker than *Stolen Kisses*. But in the earlier film there was no set subject, which made for unpredictability. Here, it is the reactions of the characters within a set framework that remain unpredictable.

SAMUELS: Speaking of unpredictability, you once compared film to a circus. Is that what you meant to imply by the comparison?

TRUFFAUT: Partly. You see, I wanted to remind people who come to film from literature that the director must always be aware that he is performing before a crowd. Men like Orson Welles, Nicholas Ray and Elia Kazan—men who have been actors, who have lived with the realities of the theater, who have worried that the public might be bored, that the play must move forward, that a progression must occur that will hold the public's attention—such men would understand my comparison between film and a circus. Even Bergman would understand. He is afraid to be boring; that is why he never goes beyond an hour and a half. One is always influenced by what he did before becoming a director. Welles was an actor. Fellini was a caricaturist; he makes caricatures in film. Buñuel was an administrator. That is why all his films finish shooting on time, use only twelve thousand meters of stock, and are edited in ten days.

SAMUELS: You are particularly good with your actors, although you are said to be very gentle on the set. How then do you get such marvelous performances?

TRUFFAUT: By gentleness. And I proceed always by contradiction.

SAMUELS: Can you give me an example?

TRUFFAUT: Yes. In *Jules and Jim* the danger was that Catherine would be too beautiful. I told Jeanne Moreau to remember Scarlett O'Hara for capriciousness, but also to bring something sad to her caprices.

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It was important that her constant shifts in mood not make her resemble a comedian: as we say in French, *"une belle emmerdeuse."* Therefore I asked for gravity where there was lightness, and vice versa. This is the method I follow in everything I do, even though it confuses the public. For example, at the end of *The Soft Skin,* when the woman has just killed her husband, I have her smile. I had great difficulty getting that expression, which is not quite a smile but the woman getting ready to smile. In real life, I suppose the woman would have fallen on the ground, screaming; but that would never do in my film. Her first reaction is relief. After that, perhaps something else will come. I had to get just the right amount of smiling, however, as you see, for otherwise the audience would think she had lost her mind.

SAMUELS: But in the preceding scene where the wife gets her rifle ready to kill her unfaithful husband, don't you think you go on awfully long? I found it boring. Moreover, I laughed where I shouldn't have. Do you remember when she puts the rifle under her coat to hide it and then walks out as if she has hidden it, whereas the audience sees it sticking out under her hemline?

TRUFFAUT: The audience in the theater broke up at that moment.

SAMUELS: So it was a mistake?

TRUFFAUT: A technical defect. After making many films, one learns that in such a scene you must first photograph the weapon and later show the woman carrying—perhaps a piece of wood under her coat. Here you have in a nutshell the difference between Hollywood and France. In *Psycho,* when Anthony Perkins wraps Janet Leigh's body in that shower curtain, I am sure there is no body there—not even a double's. But when Claude Chabrol shot a similar scene, in *The Butcher,* he actually left the "dead" actor in the sack. As a result, the actor who plays his assassin has a terrible time carrying the load. I'll give you an even more disturbing example of our lack of expertise. It concerns a film made by a director who had previously done only four or five movies. In them, he had never shot a love scene and was distraught at the prospect of having to shoot one in his next film. He was so frightened, in fact, that when he came to the scene, all he could do was tell the actors to actually make love. And do you know how the audience reacted to the fornication? "Not bad," they said, "but the scene is nothing special."

SAMUELS: One of *your* best scenes is the one in *Stolen Kisses* that shows Antoine looking in the mirror and chanting the names of the two women in his life. How did you hit on this idea?

TRUFFAUT: I needed to show that Antoine was torn between them, but there was no other character in the film whom he could talk to. Therefore, I had him talk to himself.

SAMUELS: It is very charming. But, you know, many people hold that sort of charm against you. They say you calculate such effects simply to please, with one eye cocked at the audience.

TRUFFAUT: But the scene isn't charming. It is long and makes people uneasy. In Germany, they cut it out.

SAMUELS: But what about the general point?

TRUFFAUT: The role of Antoine is so close both to me and to Jean-Pierre Léaud, who plays it, that we never even think of other people. For example, Antoine never quarrels with anyone in the films because I am the same way. If a quarrel begins, I simply leave.

SAMUELS: Is that why you won't correct misinterpretations of your work?

TRUFFAUT: In *The 400 Blows* I thought I had presented the parents and Antoine very neutrally. The parents were guilty of showing so little love; but, after all, Antoine was very difficult. Then, to my surprise, I found that audiences thought the film slanted in the child's favor. But one learns to live with misunderstanding. Once the film is finished, that's all I care about.

SAMUELS: Your films are full of inside jokes. For example, one of your colleagues from your film company appears both in *Mississippi Mermaid* (where he plays Belmondo's business partner) and in *Bed and Board.* In the latter film Helen Scott, who

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was your interpreter with Hitchcock, makes a brief appearance. And I could go on. Why do you do this?

TRUFFAUT: Why not?

SAMUELS: Very funny! How about giving me a more serious answer? You realize that you've been greatly criticized for this. Critics have said that you're playing a childish game, rubbing the noses of your viewers in their ignorance of your life, private tastes, *et cetera*. Do you just say *merde* to this criticism or do you have some defense of this practice?

TRUFFAUT: It's ridiculous to criticize this. The public isn't aware that I am putting my friends into my films. Only the few people who are aware question what I am doing. Moreover, I would never do it if I thought it might harm my story in any way. On the contrary, while writing I sometimes think, "this character is just like X. Why not have X play the role?"

SAMUELS: But it isn't only putting your friends into your films; it's all the references to other films—like having Belmondo, in *Mississippi Mermaid,* recuperate at a clinic named Heurtebise, which alludes to Cocteau's *Orpheus.*

TRUFFAUT: What difference does it make to the public if the clinic is called "Heurtebise" or "Smee"? It doesn't detract for anyone ignorant of the allusion, and it adds for someone who recognized it. But those who know how I operate and perceive ten allusions in one of my films are so terrified that they've missed ten others that out of their own vanity they condemn the whole game.

SAMUELS: There are two traditions in film. One, ultimately derived from silent film, emphasizes editing and camera movement. The other—which André Bazin seems to have preferred (and which he exemplified with a film like William Wyler's *The Little Foxes*)—is more theatrical and depends on staging. Now your closeness to Bazin is well known. I think, however, that you are not only less theatrical than the directors he professed to admire but that, indeed, your camera work and editing are more varied than that of any director of equal stature. If this is so, did Bazin have the influence on you that he is widely assumed to have had?

TRUFFAUT: I don't agree with the distinction you've made. Furthermore, Bazin overestimated *The Little Foxes*—which was just photographed theater—although it gave *him* a pretext for some interesting observations on the cinema. I would rather see a distinction made between filmmakers who attempt to keep the camera invisible—as John Ford did—and those who make it evident to the spectator.

SAMUELS: All right. But your camera was once extremely visible and now is becoming less so. Why?

TRUFFAUT: Because it became more visible in everyone else. No, I have a better reason: I have become more interested in my characters, in their situation, and in what they say.

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Relevance in Social Science, or the Proper Study of Mankind

DANKWART A. RUSTOW

There is a great deal of soul-searching in the social sciences these days. Should the sociologist, political scientist or economist remain objective, detached and above the political battles of the day? Or does he have an obligation to apply his knowledge to the urgent problems of his society? If so, should he play the role of a social engineer improving the workings of the government and strengthening the established order? Or should he be a gadfly, social critic or activist championing such causes as the peace movement and the fight for racial equality? Is objectivity possible, or is it merely a timid pose, a hypocritical form of conservatism? Questions such as these are discussed with increasing vehemence at annual meetings of professional societies, in curriculum committees, and even in the journals. Vietnam, the urban and academic crises, and the seasonal migration of professors from Cambridge, Massachusetts, to Washington, D. C., all serve to sharpen the debate without bringing it to a resolution.

To resolve it, we must ask one other question, about the nature of explanation in the social sciences. Before the scholar can define his proper station within or above the social arena, he must first be clear about his scientific task. Now that the fifty-year reign of positivism and behaviorism is drawing to a close in such fields as sociology, political science and psychology, it is a timely question to raise.

Scientific explanation is customarily viewed as a two-way process involving the scientist and his subject matter. The precise relation between these two elements, indeed, has given rise to one of the most protracted controversies in the history of Western philosophy, between idealists and rationalists on one side, and empiricists and positivists on the other. From either view of scientific explanation, the special character of the social sciences is commonly sought either in the observer's attitude or in the nature of the subject matter. Twentieth-century antipositivists, for example, have argued that the student of society, unable to conduct experiments, must instead resort to the superior method of *verstehen*, or that human events are too complex to lend themselves to the kind of generalization customary in the natural sciences. Positivists, on the contrary, have asserted the unity of all science and admitted only differences of degree. If the observer finds himself bedeviled by his own biases or the alleged complexities of the subject, let him cling the more tightly to the universal rules of evidence and inference.

Such a debate leaves the student of society in an awkward spot. Either he must repudiate the universal validity of scientific method, taking his refuge with blurry concepts such as "intuition" or *verstehen;* or he must deny the special character of his subject matter and thus reduce it to a hopelessly retarded branch of natural science. I propose that the dilemma disappears as soon as we think of scientific explanation as involving three elements—not only observer and subject matter but also audience.

To dwell only on the first two elements suggests a scientific Crusoe trying to explain things to himself. But this picture

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does not stand up to the testimony either of popular works such as the novels of C. P. Snow and James D. Watson's *Double Helix,* or of more technical studies such as Thomas S. Kuhn's *Structure of Scientific Revolutions.* The working natural scientist, in his laboratory or at his blackboard, seems to be a rather gregarious and also competitive fellow who shouts "Eureka" most audibly and participates in a buzzing network of international communication.

The audience does not merely satisfy personal vanities: it plays a role essential to the scientific enterprise. It is, literally, a group of hearers (or readers) for whom an explanation is put into words or other symbols. Fellow scientists, on hearing the proposed explanation, criticize the logic and double-check the observations, that is, corroborate or refute it. Contemporary and future scientists tackle related problems in a division of labor that alone makes scientific progress possible. Another part of the audience—applied scientists, engineers, industrialists and policy makers—may be waiting to derive practical uses from the new scientific discovery.

Judgments of the novelty, significance and relevance of a given explanation are another service that the audience renders. Novelty concerns the fellow scientist: science is the search for explanations that are not only valid (or defensible) but also new. Significance and relevance concern the entire audience, expert and lay, present and future: the greater the number of theoretical insights and practical applications that flow from a discovery, the more significant and relevant it appears. An important segment of this wider audience consists of those laymen who underwrite the cost of science: university faculties, noble patrons, heads of corporate laboratories, foundation officials and government bureaucrats.

Enough, perhaps, has been said to suggest that an account of natural science that omits the audience remains elliptic. A similar account of social science becomes downright misleading. The special difficulties (and also the special fascination and importance) of social science arise from the common humanity of the scientist, his subject matter and his audience. If he were an astronomer, he would divide his working hours between peering at the stars and reporting the sights to his fellow humans, few of whom have ever looked closely at a single galaxy or planet. But as a social scientist he is cast in the more awkward role of a man in society trying to explain to men in society how men live in society. He must strain his ingenuity to tell them anything that they do not already know, or know only tacitly, and the more he aims at universal validity or at immediate relevance the more ingenious he must become.

Giambattista Vico expressed this central difficulty in his own baroque imagery—in a passage that a century later yielded one of Karl Marx's favorite quotations:

> Whoever reflects on this cannot but marvel that the philosophers should have bent all their energies to the study of the world of nature, which, since God made it, He alone knows; and that they should have neglected the study of the world of nations, or civil world, which, since men had made it, men could come to know. This aberration was a consequence of that infirmity of the human mind by which, immersed and buried in the body, it naturally inclines to take notice of bodily things, and finds the effort to attend to itself too laborious; just as the bodily eye sees all the objects outside itself but needs a mirror to see itself.*

Observer, subject matter and audience form a triangle in the process of explanation, and the difficulty of social science reappears at each corner: The observer is too close to his subject matter. Science starts from the modification or overthrow of prescientific notions, and in a field such as physics these commonsense roots lie in pre-Galilean and pre-Socratic times. For centuries or more, therefore, the concepts of the natural sciences have been effectively insulated from the lay audience. As Kuhn has shown, in times of "normal science" the researcher's task is to elaborate the prevailing "paradigm." Once that paradigm has been stretched beyond its fit to the facts, it becomes the task of "revolutionary

* Thomas Bergin and Max H. Fisch, trans., *The New Science of Giambattista Vico* (New York: Doubleday, 1961), p. 53. Cf. Karl Marx, *Das Kapital,* Volksausgabe, 1:389.

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science" to formulate a new one. However much natural science depends on outside patronage for its financing and its choice of topic, in the development of its ideas it remains autonomous and inner-directed.

A student of society, by contrast, is not introduced to his subject by other scientists: he comes to it chock-full of commonsense notions, and his everyday experience of man and society keeps growing apace with his more scientific knowledge. Unable to set down all he knows or thinks he knows of his subject, he needs criteria to choose his topic, select his data, and formulate his hypotheses—and at each point wishful thinking or prejudice may intrude.

The observer also is too close to his audience. The impact he expects to have may consciously or unconsciously color his findings. Indeed the more persuasive the social analyst the more likely he is to be also a propagandist.

The subjects are too close to the observer. The physicist's particles and the chemist's molecules are closely under his control, hence there is the possibility of clear-cut causal knowledge. "For want of a nail . . . a kingdom was lost" makes a good nursery rhyme and poor social science. Yet in the laboratory the whole trick is to construct, if he can, such neat chains of cause and effect. And knowledge manipulatively obtained in the laboratory can then be manipulatively applied in the engineer's workshop.*

In both the laboratory and nonlaboratory sciences the student of nature generally can make his observations or take his measurements without fear of influencing the result obtained. The radiotelescope does not budge or heat the star, and the mercury absorbs only a minute and measurable fraction of the heat it measures. Only at the subatomic level, when he must use electrons to measure electrons, does he run into Heisenberg's Principle of Uncertainty.

The social scientist can neither manipulate nor even observe his subjects at will, and he crosses his threshold of uncertainty much sooner, usually as he leaves the library and arrives in the field. In personal interviews, in questionnaire surveys, in psychological tests, he always uses human beings (himself or others) to observe other human beings. The sociologist's or political scientist's field research cannot help being a series of social or political acts—he is always a *participant* observer. Therefore, as he hooks into an existing network of communication, he must be aware of the static or feedback that he inevitably engenders.

Examples of static in interview situations abound, and even documentary sources and official statistics give us a combination of message and noise. Censuses, one of our most precious and genuinely quantitative sources, can become controversial when government itself is based on a count of noses. In Nigeria in the mid-sixties, two hotly contested population counts became the prelude to coup and secession. In Lebanon, the ruling class, fearful of upsetting the established six-to-five ratio of Christians to Muslims, has not allowed a census since 1932. In Turkey, when a team of survey researchers asked each of a few hundred peasants "what he would do . . . if he were president of Turkey," one of them stammered in evident panic: "My God! How can you ask such a thing? How can I . . . I cannot . . . president of Turkey . . . master of the whole world?"* Closer to home, a recent editorial in the Columbia University *Spectator* entitled "Fold, Spindle, or Mutilate" told the undergraduates just what to do with a questionnaire suspected of being part of a concerted move by the American Council on Education to help admissions officers keep radicals off the campuses.

His observations accomplished, the social scientist faces two final hurdles. Audience and subject matter are too close to each other. His scientific forecasts are likely to turn into self-fulfilling or self-defeating prophecies—something that rules out scientific stock-market forecasts and complicates election predictions. Even his more cautious if-then statements will seem less

* For an elaboration of this connection, see the work of the philosopher-physicist Norwood Russell Hanson, *Patterns of Discovery*, chapter 3.

* The survey is reported in *The Passing of Traditional Society* by Daniel Lerner *et al.*

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striking or relevant once they have been widely accepted by the public. For example, the contingent predictions implicit in Keynes's *General Theory* (in industrial societies after a major war, if you do not increase peacetime spending, there will be a major depression) seem less relevant today because people do not want them to become relevant and Keynes taught them how to avoid the contingency. Similarly, factory management, universal schooling, military training, presidential press conferences, stock-market manipulations, personality tests, electioneering, strikes and sit-ins are so many branches of applied social science that have lost their novelty and mystery as they have become part of our daily lives.

The audience is also too close to the scientist to accord him the respect that he may deserve. Any child of three is his own applied psychologist, every adolescent becomes an amateur sociologist, any stockbroker thinks himself smarter than Paul Samuelson, and any reader of the New York *Times* is ready to dispute Hans J. Morgenthau. Here the triangle closes: the audience is as chock-full of commonsense notions about man and society as was the social scientist himself at the start of his inquiry.

Some of the same disrespect has been shown by those teachers of philosophy, mostly followers of Wittgenstein, who have been most careful to stress the role of the audience in explanation. Social science, they have held, is neither possible nor necessary: it is impossible because human actions are context-bound and not susceptible to generalization, and unnecessary because ordinary language provides a subtler instrument of explanation than all the labored propositions of "behavioral science." This is a counsel of despair. The question is not whether there can be a science of human behavior but how it can master the difficulties that flow from its quality as an exercise in collective self-knowledge.

In some social sciences the difficulty is attenuated. The historian and the anthropologist (not unlike the astronomer) can tell their audiences about events far away in time or in space. The here-and-now is likely to influence mostly their choice of theme, as when Plutarch writes his parallel lives at a time when Greek and Roman cultures begin to blend or when Malinowski and his readers find relief from Victorian taboos in contemplating the idyllic sex life of the Trobrianders. Of course, when the historian or anthropologist—an Arthur Schlesinger, Jr., or an Oscar Lewis—deals with aspects of his own society, he must make up for the loss of distance with a refinement of sensibility and subtlety of expression that approach those of the novelist. At their most responsible, historians and anthropologists use their skills to explore the full breadth of human experience so as to sharpen the sensitivity and widen the freedom of choice of their audiences.

The difficulty continues full force in those disciplines that seek to explain aspects of man and society always and everywhere—psychology, sociology and recently political science. (Economics is a special case, of which something will be said later.) The troubles of these disciplines were compounded, in the half century from 1920 to 1970, by certain methodological precepts derived from positivism and behaviorism.

The chief tenet of positivism is that, whatever the topic of inquiry, you can redeem it by the method you employ. To be scientific, you must aim at generality and abstraction, use technical language, establish statistical correlations, test your hypotheses through prediction, and abstain from value judgments. The effect of behaviorism is to narrow the range of acceptable observations, or "data," that may serve as grist for the methodological mill. The data must consist of palpable behavior rather than internal states of mind, be replicable, and be convertible, at least in principle, into quantitative indices.

Some of these demands, such as those for quantification and precision, are sound enough but must be judged in context. The scholar's method includes the entire range of his explicit or implicit choices regarding the topic studied, the evidence admitted, the inferences and conclusions drawn, and the language and other symbols employed. The chain will prove no stronger than its weakest link, and in the case of behavior-

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ism the total result is mostly stultifying. The underlying mood is conveyed by two leading spokesmen of behaviorism, Ernest Hilgard and Daniel Lerner:

> The social scientist longs for something firm in the way of discovery or invention that will stand as a bench mark of scientific advance. If only he could discover something like x-rays, he could show that his instruments were an advance over unaided observation by wise men. If only he could invent something like Mendeleyeev's periodic table of elements, or like Mendel's law of hereditary transmission! He needs something that is genuinely new, perhaps a little esoteric, yet capable of popularization.*

Such a program owes more to the reconstructions of the logician, and perhaps to science fiction, than to the practice of natural scientists. As P. W. Bridgman has impatiently exclaimed: "The scientist has no other method than to do his damnedest."

The proliferation of esoteric jargon insulates the scholar not only from his lay audience but also from his fellow scientists —until each behaviorist is ensconced behind his own verbal barricade. Here is an impregnable position that has the added advantage of making many empirically untenable statements true by definition: the search for grand theory too often turns into a grand exercise in tautology.

An equally serious danger lurks in the widespread confusion about correlation and causality. Most of the significant effects that the social scientist can study will not hold in all situations, and a high degree of correlation therefore is all he commonly has a right to look for. But this does not absolve him from the search for causes. In contrast to the correlations between pressure, heat and volume as formulated in thermodynamics, his correlations are not commonly reversible. To give a specific example, Seymour Martin Lipset, the Harvard sociologist, in a widely quoted article, showed on the basis of statistical data for various countries that there is a close correlation between democracy on the one hand and affluence and literacy on the other. He did not go on to ask whether rich and well-educated people make better democrats, or whether democracies provide better schools and a more bracing economic climate, or whether some third factor, perhaps industrialism, accounts for both effects. The result is a sort of epistemological quietism, for purposeful social action must proceed from a knowledge of causes.

The insistence on external, "behavioral" data is meant to keep out the observer's prescientific notions, his human knowledge of his subject, and to protect his enterprise from anything so personal as empathy. "Behaviorism is when you pretend to be dumber than you are."* The attempt has been carried to extremes by John B. Watson, the founder of behaviorism, and B. F. Skinner, whose psychological experiments were done on rats and pigeons in conditions of semistarvation.

In sociology and political science, the demand for external data has been amended by admitting responses to questionnaires as "verbal behavior," a concession that gets the worst of both worlds. Strict behaviorism, ignoring states of consciousness, was driven to the study of the physiology of perception and the neurology of learning. Although it thus excluded most of what others might think of as psychology, it did manage to tell its audience things it did not already know. The neobehaviorist emphasis on surveys, on the other hand, rests on the assumptions (1) that men know their attitudes well enough to testify about them, (2) that collective action results from the summation of such attitudes, and (3) that meaningful generalizations can therefore be drawn from the statistical processing of such testimony. The trouble is that to the extent that the first two assumptions are true, the third is false. There are situations where action springs from conscious intent and individual efforts merge into collective results—probably the vast majority of social situations are of this type —and these warrant descriptions or limited generalizations such as are customarily

* Ernest R. Hilgard and Daniel Lerner in *The Policy Sciences*, ed. Daniel Lerner and H. D. Lasswell.

* In the words of my father, Alexander Rüstow (1885-1963), a German sociologist of the humanist school.

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made by the ethnographer, the historian or the international affairs specialist. But universal lawlike propositions about man and society will prove interesting to the audience only to the extent that they rest on the discovery of unconscious motivations or inadvertent effects—that is, to the extent that the first two assumptions are *not* true.

It is not very illuminating, for example, to be told that democratic politics is the product of group competition for office—for all politicians and most common citizens are well aware of this. No amount of technical terminology and no amount of computerized survey data will convert this banality into a profound insight. On the other hand, A. Lawrence Lowell's proposition that competition between two parties begets political moderation, if true, is interesting. So is Robert Michels' thesis that large-scale organizations engender an oligarchic structure even when they espouse democratic ideals. Each theory specifies an unintended and unexpected effect.

The demand for ethical neutrality derives in part from Max Weber's much misunderstood doctrine of *Werturteilsfreiheit.* Its sound kernel is that wishful thinking cannot substitute for evidence—whether in natural or social science—and that no good teacher or social critic (any more than a good artist) will resort to preaching or moralizing. Elevated to a dogma, value freedom resembles nothing so much as a common practice of hospital disinfection. It spreads a disagreeable odor and eliminates most of the germs—while giving the run of the place to some of the deadlier ones.

Without competition from considered judgments, personal prejudices will be reflected in the scholar's vocabulary or in the practical applications he draws in his more speculative moments. Thus, Harold D. Lasswell conveys his genteel cynicism in a string of idiosyncratic definitions (elite "are those who get the most of what there is to get; . . . the rest are mass"), and B. F. Skinner bares his power instinct in his utopia of subliminal totalitarianism, *Walden Two.**

* For a critique of the totalitarianism implicit in experimental psychology, see A. R. Louch's *Explanation and Human Action.*

Such social and political prejudices usually are enshrined in the choice of topic and the method of treatment.

All scientists worthy of the name, whether mathematicians, microbiologists, sociologists or archaeologists, make a number of moral commitments: to truthfulness, imaginativeness, appreciation of unity in diversity, and plain hard work. Natural scientists, in addition, must assume the desirability of extending man's dominion over nature. The memory of Hiroshima and the prospect of test-tube babies make this assumption more than dubious. But such questions of application belong conventionally to the social sciences and humanities—which may be another way of saying that the natural scientists, until beset by recent pangs of guilt, have been among the most unconscionable buck passers of history. At any rate, the values of natural science are not noticeably different from one discipline or topic to the next and therefore, like the audience, can be disregarded by the methodologist. The social scientist, by contrast, is caught in a web of much more specific values. His every choice of theme is based on some particular set of moral assumptions. His perception of this or that event as a social fact rests on another type of value judgment. The resistance that the subjects may offer to his experiment or observation involves him in possible conflicts of values. And the uses to which his audience puts his published findings raise a host of further moral questions for which he cannot decently disclaim responsibility.

The use of jargon, the narrow view of evidence, and the substitution of correlation for cause all remove the behaviorist from the real social world of moral choices. The doctrine of value freedom makes this remoteness explicit. "Value freedom" in the choice of topic sets the researcher adrift on a sea of triviality and irrelevance. What better way to avoid moral questions than to dwell on the inconsequential? "Value freedom" in his conclusions puts him back ashore as a passive supporter of the wealthy and the powerful because, whereas others might have to be shown how, it is they who dispose of the most effective means of appli-

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cation. Ethical neutrality, therefore, generally means conservatism—not by conviction but by default.

The behaviorist's penchant for triviality ill accords with his ambition for universality. Mary C. Wright has expressed the contrast in a passage that applies as well to miscellaneous behavioral research as it does to miscellaneous historiography:

> In all the social studies there is need for perennial vigilance in two directions: Vigilance on the one hand against the "brick-by-brick" approach, against that default of the imagination which leads us to suppose that *all* phenomena are worth our attention, that sound research on *any* topic is a contribution to knowledge; that when the bricks are all assembled (some centuries hence), they will of themselves take the shape of a well-designed construction and not a rubble heap; and vigilance on the other hand against the "magic method" approach, against the conceit that we can concern ourselves solely with the formulation of general propositions and with debate over abstractions, that the specific phenomena are too numerous and tiresome for us to labor over, that the handling of specific data is something that is farmed out to helots, that our tentative sketch of the structure will suddenly take on substance when we blow it up by our special method.*

The gulf between these opposite dangers has lately been bridged by the comforting notion that the brick-by-brick approach *is* the magic method.

The behaviorist tries to make social science into a natural science by cutting the links of humanity between scholar, subject and audience. Jargon puts off the listeners and allows us to forget that it is human beings we are studying. The ban on empathy makes us forget that we, too, are human. The demand for value freedom rules out the pressing questions of the audience, and the shift from causality to correlation eliminates the more practical answers. In the end these efforts prove futile. The human qualities of social science cannot be exorcised, only grossly distorted—and one of the worst distortions is the ease with which the "value-free" scholar can become a brain-for-hire to the wealthy and the powerful.

* From *The Last Stand of Chinese Conservatism: The T'ung-chih Rebellion, 1862-74.*

The remedy is to restore each of the links. Since you cannot escape humanity, relax and enjoy it. Plain language will allow us to speak not just to our fellow professionals, who may be off on the same semantic binge, but to the entire audience of those who wish to understand the workings of society. The works of Tocqueville, Keynes, Myrdal and many others are proof that clear prose does not condemn us to shallowness or lack of technical rigor.

Putting substance over method will allow us to make our choice of topic explicit.* We may wish to resolve the contradictions or fill the gaps in previous explanations. We may wish to help solve some pressing problem of human suffering or social injustice—the social scientist's peculiar contribution being to expose the intellectual structure of the problem. (It was not concern about falling bricks or leaping lovers that made Newton discover the law of gravity!) Or we may wish to engage in "mere description" (a phrase unjustly disparaged by behaviorists) so as to extend our knowledge of the variety of the human condition and to widen our own range of choice.

Abandoning the pose of detachment and objectivity, we should instead strive for Erik Erikson's ideal of "disciplined subjectivity." Subjectivity will allow us to choose our topic from some passionate concern, and discipline will help us to harness our passion to the service of some larger human cause. Subjectivity admits empathetic knowledge into the record, but discipline checks it scrupulously against all other sources. Subjectivity, we must remember, begins at the very source of social science, on one or both sides of the face-to-face encounter between observer and subject—whether it is our own encounter or that of a census taker, pollster, test psychologist, news reporter or field anthropologist. Discipline allows us to correct the attendant distortions. Reason

* Economists, by long training accustomed to using method as a means to substantive ends, have made recent contributions to political and social theory that put the professional sociologists and political scientists to shame. See the works of Kenneth Arrow, Kenneth Boulding, Anthony Downs, Albert O. Hirschman, Charles E. Lindblom, Mancur Olson, Thomas C. Schelling and others.

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and emotion not being opposites, it is not the strength of our emotions but the conflict between them that will cloud our reason: we come no closer to the truth by being untrue to our feelings. For these and other reasons, facts and value for the social scientist remain distinct but inseparable.

To involve the social scientist anew with both his subject matter and his audience is to restore the link between those two, the link of explanation, application and relevance. Any application, of course, is likely to transform the very situation from which the knowledge itself was derived—but such is the price of social self-knowledge. To be relevant to your own generation is to risk irrelevance in the next—the only certain escape from the dilemma being that into permanent irrelevance. Keynes in his *General Theory* and Myrdal in *American Dilemma* formulated insights of intrinsic interest and of great practical significance to their own time. As their findings were applied, in the countercyclical policies of successive governments, or in the Supreme Court's historic *Brown* decision, these thinkers helped to move reality to another phase with its distinctive set of problems.

The greatest of the social and human scientists went beyond such policy issues to discover some large and hidden truth—large enough to be applicable to most men in most societies but sufficiently divorced from individual consciousness not to have been widely perceived. Two centuries ago Adam Smith pondered that it was not from the generosity but the self-interest of the butcher and the baker that we expect our dinner. He likened this effect to the workings of an Unseen Hand that created harmony amid conflict and turned private greed into the public satisfaction of wants. More recently, Freud described the Unconscious as the secret battleground of the Id, the Superego and the Ego.

Halfway in time between Smith and Freud, Karl Marx formulated a whole cluster of insights into the nature of modern society. One of these concerned the growing disparity in any industrial system between the "forces of production" that tie us into a wider division of labor and the "conditions of production" that permit us less and less personal control over our daily lives—the paradox that as man becomes master of nature he becomes a servant to other men. Another was the intimate connection between the economic system, political order and dominant forms of thought, and the pervasiveness of class interest in all three. As a theorist of revolution, Marx had a keen sense of both continuity and change, of the "new society growing in the womb of the old." As a moralist he had a piercing eye for the injustices, exploitations and hypocrisies inflicted by man on man. In his method of social inquiry, although inclined to occasional hyperbole ("The history of all hitherto existing society is the history of class struggles"), he was among the first to make massive use of empirical data—drawn mostly from British government reports. He also knew that a social thinker's Archimedean point (his point of relevance) was his understanding of the forces at work in his own epoch and society. As Marx sneered at Feuerbach: "The philosphers have only *interpreted* the world, in different ways; the point is to *change* it."

The terms "Unseen Hand" and "Unconscious" make it clear that what the greatest social thinkers contributed were not so much discoveries as revelations. The human scientist's most proper sphere of study is the unconscious and the inadvertent.* The characteristic reaction of the audience is not (as in natural science) "Who would have thought . . . ?" nor (as in behaviorism) "What else is new?" but rather "Now that you mention it . . ."

Whereas specific feats of social analysis, such as those of Keynes and Myrdal, become outdated as the result of application in public policy, the broader efforts of a Smith, a Marx or a Freud feed back into reality mainly through a gradual transformation of social consciousness. Marx and Freud, moreover, retain a timeless rele-

* Frederick A. Hayek, thinking of Smith's rather than Freud's discovery, has proposed in *The Counter-Revolution of Science* that it is the social scientist's function "to explain the unintended or undesigned results of the actions of men."

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vance. For, although the specific social injustices and sexual repressions that they exposed are now a matter of the past, man's capacity for devising and rationalizing new forms of exploitation and self-deception seems well-nigh inexhaustible.

Whether the feedback loop is short and narrow or broad and wide, it rules out the behaviorist's vision of a timeless social science. Whatever may be the common elements of character or situation that Cromwell and Robespierre share with Lenin, there is this crucial difference that he knew about them and not they about him.

Freudian terms, such as Id, Ego, Superego and Oedipus Complex, point to the mythmaking aspects of psychoanalysis, its quality as moral philosophy for an age that likes its ethics in scientific guise. And the mythological aspects of Marxism, its character of revelation in the religious sense of that word, have often been noted. The point in our present context is that social science, as an exercise in collective self-knowledge and as an implicit call to new types of social action, has always a moral dimension and in its higher reaches quite properly merges into religion.

But we cannot all aim to be Freuds or Marxes, and for the workaday social scientist who has escaped from the behaviorist underbrush the question arises what overall view of society he should adopt and what social role he should assign to himself.

Much of the development of modern social science, from Hobbes and Adam Smith to the recent behaviorists, has been under the spell of a mechanical view that casts the applied social scientist in the role of a social engineer. The social machinery typically is seen as driven by some kind of duress: the competing power urges of Hobbes's natural men, the acquisitiveness of economic man, the starvation of Watson's rats, or the marginal habitat of pygmies or Eskimos that allow the anthropologist to define the "functional requisites" for the survival of any society. Whatever the form of the duress, it is seen as powerful enough to impel a single-minded, rational line of conduct that can be measured and predicted.

Yet, marginal situations aside, things in life may not fit as tightly as the model requires to retain its explanatory force: this was the chief difficulty of classical economics. Applications designed to soften the duress may further reduce the likeness of the model: this is the difficulty of applying classical or marginalist economics to an age of abundance. Or, where the application involves a clash of wills, it may be thwarted by counterapplications: as, for example, Napoleon's use of a unanimous plebiscite to set aside the popular will proclaimed sovereign a decade earlier.

The history of constitutional and representative government is rich in instances of this last type. The mechanical nature of the underlying theory is evident in the clockmaker's imagery of "checks and balances" and the thermodynamic metaphor of "pressure group." Each new refinement of the mechanism of popular representation—political parties, primaries, referendums, recalls, lobbies, pressure groups, press conferences, committee hearings, televised conventions—only added a more cumbersome set of devices that could be manipulated more readily by those already powerful or wealthy than by underprivileged groups, let alone by the individual citizen in opposition. This fundamental dilemma was first formulated in Robert Michels' study of "the oligarchic tendencies in modern democracy."

The mechanical and engineering view of society is reincarnated in much of the recent literature celebrating the "end of ideology" and looking "toward the year 2000." Social science, of course, can and should transform many contentious issues into technical questions. (Keynesianism is a good example.) But the agenda of latent social conflict is inexhaustible to begin with. Furthermore, the selfish or narrow-minded resistance that any technical solution will encounter and the new problems that it is almost certain to produce as unintended side-effects will add further items to that agenda. The end of ideology can be anticipated only in an anarchist utopia where (in the words of Engels) the "governing of men" has yielded to "the administra-

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tion of things," or else in a totalitarian one, where the scientist (as in *Walden Two)* has taken the dictator's throne. Luckily, the second is as unlikely as the first.

A viable alternative to mechanics and engineering is a clinical or therapeutic view of society. Crane Brinton suggested that the student of society, like the anatomist, must make precise observations with only occasional help from the laboratory, and that he must deduce causes from symptoms and syndromes. The therapeutic view also is clearly implied in the psychohistorical writings of Erik Erikson.

The medical analogy does not presuppose an "organic" view of society as a "body" with some absolute claim to priority over its "members," or its own "law of growth," or some uniquely defined state of social "health." Indeed, Brinton's and Erikson's conceptions are close to such physically or mathematically formulable constructs as Norbert Wiener's cybernetics or John Von Neumann's theory of games.* Whereas the behaviorist is divided from society by his pose of pseudo detachment, the clinician or cyberneticist is linked to it by an attitude of caring and taking care or by a desire to steer past obstacles. Instead of aiming at timeless and placeless generalizations, he brings knowledge derived from other times and places to bear on a situation that confronts him here and now. Whereas the behaviorist escapes his moral responsibility in a never-never land of "value freedom," the social scientist as clinician is bound by a Hippocratic Oath.

American society stands more sharply divided today than it has been for a century, nor is there any early catharsis in sight. Such a time of crisis can be a time also of discovery and innovation. The many social and psychological strains laid bare, the new ambitions and enthusiasms, the new cruelties and self-sacrifices, the new rituals and incantations make a richer laboratory than all the rats and pigeons in the world. America's foreign and military policies, moreover, in their sickness and their health, affect all of mankind; conversely, our crisis reflects in heightened form a malaise common to other industrial societies. The very complexity of our present discontents, therefore, invites many relevant analogies from other geographic settings and historic periods.

In short, we live in a unique time of stimulation for the sensitive and dedicated student of society, whatever his particular temperament or curiosity. Naturally, social scientists in time of crisis will turn out to be as sharply divided as society itself. In the revolutionary year of 1848, one of the two keenest social observers of the century published his *Communist Manifesto;* the other, Tocqueville, served in a government denounced in that document as "but a committee for the management of the common economic interests of the bourgeoisie." Whatever a social scientist's sympathies in the current struggles, he must use his richer sensitivity, his trained insight, his accumulated knowledge, indeed his stronger passion, to penetrate more deeply into the true issues and to advance further toward the viable solutions than can his lay contemporaries. A social scientist's effectiveness as theorist or practitioner will depend on his having found the greatest common denominator between his most personal sensibilities and experiences and the concerns and sufferings of some sizable portion of mankind.

The astronomer peering at his stars, the biologist raising a culture of bacteria, the chemist testing the composition of his molecules, in fact, any outside observer may meaningfully search for immutable, value-free laws. But the social scientist is an observer from inside society, and within those confines his task becomes both more modest and more difficult. As a theorist, his function is to ascertain the margin of choice offered by the human condition and to clarify the choices within that margin.* And this implies, as his most effective practical contribution, the reduction of human suffering.

* For an application of cybernetics to the problem of politics, see Karl W. Deutsch's *The Nerves of Government.*

* I have elaborated this conception of social science in my book, *A World of Nations* (Brookings, 1967).

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DEBATE

I. Animal Experimentation and Evolution

CATHERINE ROBERTS

I should like to thank Dr. White for accepting my proposal to debate the problem of animal experimentation in contemporary biomedicine. His acceptance is particularly gracious in view of my recent critique of the methods and goals of his current neurosurgical research. Since the value of any confrontation between two minds in radical opposition is proportional to the breadth and clarity of their respective visions, we have agreed to speak from the widest evolutionary, social, ethical and religious perspectives of which we are capable.

It would be a delusion to maintain that, since animal experimentation is apparently here to stay as an aid in saving human life and reducing human suffering, the problem under debate is really no problem at all. That one of the most distinguished neurosurgeons of our time has set aside a portion of his heavily committed schedule to justify a decade of research on animals is clear evidence to the contrary. Experimental biomedicine, already feeling the impact of an intensified attack upon its methodology, is quite aware that the problem is real and hopes to silence its adversaries by defending its actions to the intellectual and ethical satisfaction of all concerned. I am convinced that this hope is futile.

Meanwhile, the use of sentient animals in laboratory experiments continues to spread all over the civilized world. This growing practice represents inevitable human progress, so we are told, because it is carried out for the good of man and because the human, by any standard, is more important than the animal. It is undeniably true that Homo sapiens comes first. There are, however, compelling intellectual and ethical grounds for believing that the experimental use of highly developed forms of life is actually impeding human progress and that for the sake of men, as much as for animals, the practice must be ended. The final answer to the question of whether to retain or abolish the sentient laboratory animal may require one of the most decisive choices yet made by evolving life.

Human behavior is an elective response to alternatives. Throughout man's long evolutionary history, he has been continually confronted with choices. Prehistoric man, living with lower animals in a harsh and hostile environment, was forced to make vital decisions upon which his physical survival depended. Whether, in contrast to the animals, he made moral choices between good and evil because of his religious instinct and experience, we do not know.

Some six thousand years ago, when civilizations began to emerge, the human species had long since become a fixed and recognizable physical type and was well into its psychosocial phase of evolution. Unlike the long period of slow development of body and mind that preceded it, this new evolutionary stage brought a sudden expansion of human consciousness through accelerated communication and transmission of acquired knowledge, wis-

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dom and experience, as well as of the religious norms of human behavior. The growth and dispersion of the three great monotheistic religions laid particular stress upon ethical conduct. Men were exhorted to make choices in conformity with moral standards of good and evil that were held to be absolute and eternal divine revelations. To a large extent the expansion of the civilized consciousness has depended upon the recognition that the conscience, guided by its traditional religious heritage, was able to distinguish between good and evil and was thus obliged to make moral choices. Civilized man, as the historical record shows, has exhibited the extremes of conformity and nonconformity to this obligation. Yet, however great his range of ethical conduct, he has, until recently, been fully aware that he had a functional conscience.

Man in the twentieth century is still very much in the psychosocial stage of human evolution, which differs, however, from all preceding stages in the nature of its interplay between consciousness and conscience. The organized acquisition of new biological knowledge and its rapid communication and application are expanding human consciousness at a breathtaking rate. The faster the pace, the greater the number of ethical choices to be made. But in a predominantly godless world where most civilizations no longer take seriously religion or the human-divine relation, the sacred criteria for choosing between good and evil are largely neglected. Although standards of decent human behavior and recognition of what are called Christian virtues have never been uprooted, the contemporary ideal is, in fact, a free conscience, where any ethical standard and conduct is as good as the next. Democracy, equality, and freedom from traditional authority at all costs! The modern conscience, breaking with the past and denying the existence of absolute and eternal criteria to guide its choices, often considers itself autonomous and infallible but is in truth pitifully immature and undernourished. Conforming mainly to the authority of expanding scientific knowledge about the reality of nature, it has increasing difficulty in function and operation. Scientists themselves are beginning to experience these difficulties. Aware of their social responsibility and not knowing how to meet it, some are working to keep society better informed of the implications of their results and, in turn, to obtain outside aid in guiding the further advance of biology and medicine. At the same time, an increasing number of men and women, bewildered by contemporary progress, are experiencing failure of conscience: they no longer dare to choose. The result is a morally chaotic world that is becoming an almost unbearable place in which to live and die.

What seems to be most lacking is a unified sense of rectitude about what we are doing and where we are going. Most of us have experienced periods of acute helplessness and frustration in the face of a seemingly uncontrollable scientific advance that is sweeping life toward an unknown goal. Our great mistake is to suppose that this biological and technological progress is synonymous with the main path of human evolution. It is not. It is only a sidepath—but one that life may have had to experience in order better to distinguish good from evil. Ever since Homo sapiens left the main road for the attractions of scientific knowledge and power, he has been increasingly unable to find the happiness he seeks. Nor can he ever find on a sidepath leading away from the stream of evolution to which he belongs the inner joy and peace that are his birthright.

The main path for evolving human life leads toward ultimate reality: true human evolution, regardless of what secular and scientific humanists think, is a spiritual ascent toward the Good* and is based upon

* Plato himself never made more than veiled allusions to the nature of his concept of the Good, although it was both the summit of his hierarchy of ideas and the spiritual reality to which he was irresistibly drawn throughout his life. He, and later Plotinus, who expounded the concept at great length, saw that the Good, this divine center of perfection and transcendent source of all else, is fully knowable only to itself and thus beyond man's power of rational understanding. Yet they also saw

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the interplay between consciousness and conscience. But with so much human energy being spent on expanding the consciousness alone, we obstinately maintain that this *must* be life's predestined path because there is no other. At the same time we are uneasy in the presentiment that it may be leading us to our final doom. Having lived for years with the theoretical possibility of nuclear suicide or the transformation of Homo sapiens into a dehumanized scientific robot, and being quite unable to prevent the horrors of unnecessary war and starvation, we cannot rid ourselves of the fear of extinction known to our primitive forefathers. Far more knowledgeable and sophisticated than they, but far less able to sense the evolutionary rhythm of life and death and to accept the natural corruption of living matter and the incorruptibility of the spirit, we have become frantically preoccupied with ensuring the physical survival of both the species and the individual. Our consternation is intensified because we are still guided by a sick scientific conscience that lacks sufficient strength and resolution to make moral choices.

Life, now faced with decisive evolutionary alternatives, has need of all its resources of mind, spirit and intuition to make the required choices. No longer can it allow its further development to be guided by a conscience that bases its decisions solely on scientific knowledge.

Most biomedical scientists appear to be students of life who have not yet seen it whole. This implies no wholesale condemnation of their perspective. Their time-honored goals of understanding, aiding and saving life remain noble ones, and their motives certainly include love for their fellowmen and sympathy and compassion for their sufferings. Opponents of vivisection, blinded by its horrors, tend to ignore this fact, but it is unfair to scientists to do so. Modern vivisectors are not criminals for whom new restrictive laws are needed, but human beings whose conscience needs to be awakened from its moral apathy. For with their increasing power over life and death and their belief that science must do all it can, they are allowing many of their expanding goals to become as ethically shoddy as their means.

Let us first ask the biomedical scientists who depend upon laboratory animals why they consider human life so precious that it must be saved at all costs. They would better serve mankind by giving more thought to the criterion of life and less to that of death. They must tell us what all their feverish biological activity is really for. They must make it absolutely clear and unambiguous why they are compelled to penetrate the secrets of life down to the minutest scientific detail and to apply their knowledge before its full implications are understood. So far their only answer seems to be that human progress demands that life's intellectual potentials be realized so that we can all live longer and suffer less. *But the realization of life's spiritual potentials, whereby the operation of a healthy conscience could place human behavior in harmonious accord with the mainstream of evolution, is ignored by these modern life specialists.* In proclaiming that the "best" state is the longest possible life of a healthy body and mind, they intensify man's unnatural fear of the struggle, suffering, and preparation for death that is necessary for the spiritual maturation of the species.

The failure of modern biomedicine to see life whole has resulted in confused goals and paradoxical behavior. We reduce life's rate of propagation by mechanical and chemical means and destroy with little compunction unwanted human embryos so that we may give better care to the fewer individuals remaining. But modern medicine is not satisfied with ensuring a minimum of medical aid to all. Medical care now embraces resuscitation by drugs and machines to delay the natural termination

that knowledge of the good is attainable through becoming good, and that this progressive approach to perfection through participation is man's inevitable destiny. They saw the Good as a divine center leading the human race upward; and as spiritual aspirants with mystical experience and intuition, they knew that the human soul must strive toward goodness, righteousness, beauty and truth, and that this act toward the Good is the highest form of human love.

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of aged lives, together with various kinds of euthanasia to put abrupt ends to lives of suffering. Medical care prolongs the life of a patient by replacing a defective organ with a fresh one snatched from a dying patient regarded mainly as a donor. Medical care embraces such vast possibilities for the treatment of human ills and the permanent alteration of the human body that we already have plans for the surgical, pharmacological and genetic regulation of human behavior. No longer content with treating the sick and, in fact, often morally at sea as to how far treatment should go, some biomedical scientists are issuing scientific directives for the ethical improvment of the healthy.

That many of the goals of contemporary science are highly questionable is already obvious to those scientists who are feeling the conscience crisis within biology and medicine, but so far they have remained singularly passive with respect to scientific methodology. There has been no organized protest from within biomedicine against the dogma that the advance of science justifies all conceivable means, even to the infliction of agony upon lower forms of sentient life. In contrast, antivivisectionists, who are rightly intensifying their attack upon biomedical methodology, remain uncritical of scientific goals. In their desire to rescue the laboratory animal, they are now advocating more efficient alternative methods of research and are thus indiscriminately encouraging research regardless of its ultimate purpose. The problem of animal experimentation cannot be satisfactorily solved by supporting means or ends of dubious morality. Evolving life needs to be seen from a still higher perspective. Its conscience is at stake.

Animals, lacking, so far as we know, conscience and knowledge of the Good, strive to realize their limited potentials by choosing what is best for their survival and for a life in harmony with their environment. Men, aware of the spiritual realm, have quite different strivings. Moral choice between good and evil is a uniquely human responsibility that spiritually elevates man above the rest of creation. His relation to the lower sentient life at his mercy then becomes vital for his further ascent. So far his enormous intellectual, emotional and spiritual superiority has not eradicated his anthropocentric view that human evolution must progress by the unrestrained exploitation of subhuman life.

Despite the wishful thinking of many antivivisectionists, the silent suffering and the anguished screams of laboratory animals *have* saved human lives, reduced human suffering, and prevented and cured diseases. But this welcome boon to mankind is not the essence of human progress or evolution. It is simply care and maintenance of physical life. That human ills can be effectively ameliorated through prior cruelty to animals is true from a self-centered point of view. From the evolutionary perspective, where the interrelation of all forms of sentient life comes into view, progressive well-being depends upon the highest form protecting and caring for the lower with compassion, mercy and understanding. Innocent life has rights that we, who are not innocent, have not yet understood. But, one might say, if the spiritual potential of physical life is to be realized, surely it is only common sense to use all possible means to maintain individual life as long as possible. Granted, insofar as such means are conducive to spiritual enlightenment. The continued acceptance, however, of immoral means by doctors and patients disfigures their goals, increases their ethical apathy and insensitivity, and becomes at last a gross deflection from the Good toward which all human life is evolving.

Our present knowledge of anatomy, physiology, genetics and pathology cannot, of course, be unlearned. But regardless of the true benefits accruing from its application in medicine, we have no justification whatever for continuing to wrest still more knowledge out of lower sentient life by torture, mutilation and death.

All the biomedical knowledge we now possess has not in any way made man more moral. And since much of it was acquired through the agony of countless millions of innocent lives, and since Homo sapiens would have survived without it, its acquisi-

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tion has no doubt done more evolutionary harm than good. For man comes first—and he has degraded his potential and retarded its realization by more than five hundred years of scientific atrocities against animals. The scientific age still sees no valid reason for abolishing this practice. But abolish it we must, because evolving human life puts increasing demands upon the self-restraint and self-sacrifice of its members. Man evolves through the suffering and death of individuals. To choose to oppose these inevitabilities through the continued infliction of cruelty upon animals is evolutionary stagnation, if not regression.

In Denmark the first chair of behavioral physiology was recently established for Dr. A. Mosfeldt Laursen, whose experimental investigations of mental diseases and insight into the handling of laboratory animals have gained wide recognition. Although there is no general agreement about the therapeutic value of violent mutilation and injury of the brains of the mentally ill, Dr. Laursen's animal experiments have convinced him that surgically induced brain lesions can be effective in eliminating some of the fear and terror so often associated with mental diseases. Through the widely used method of implanting electrodes into specific areas of the brains of anesthetized animals, he has studied the conscious responses of cats to doses of electric current varying from weakly stimulating to permanently injurious. At the same time, he has developed special methods for keeping his laboratory animals relaxed and trusting in order to attain the best experimental results. I would say that any "expert in behavioral problems" who chooses to gain the confidence and trust of healthy animals so that he can mutilate and torment them shows a deplorable lack of understanding of human behavior. As one of Dr. Laursen's own countrymen, P. Agersted, so well put it in challenging the motivation of animal experimenters: "Animal suffering benefits mankind. What is done is done for the sake of humanity. Apparently none of these scientists realize that they could just as well use this motive for stopping painful animal experimentation. . . . For many, many more people than is generally supposed suffer at the thought of what goes on in laboratories, and still more would become extremely agitated and uneasy in their minds if they knew of the atrocities of the extreme forms of animal experimentation." Surely this thought, centering attention upon the increasingly intolerable *mésalliance* between contemporary scientists and sentient animals, deserves serious consideration by all those who are engaged in the prevention and cure of mental diseases.

Dr. White's contributions to neurological research have added the mammalian brain to the other organs that have been successfully isolated and transplanted. Although he does not claim the feasibility of transplanting the human brain, he hopes someday to maintain it in an isolated state, and he expects this scientific feat, together with his animal experiments, will lead to a more effective treatment of diseases of the brain and to a greater understanding of its nature and function. Despite some opposition to his work, he enthusiastically carries on in the conviction that his studies represent inevitable biological achievements. With equal conviction, I believe that they are not biological achievements at all, because any true study of life, being a part of the spiritual ascent of evolution, must be moral in both means and ends. I further believe that no human achievement in the vast region of mind, soul, consciousness and subconsciousness can be expected except through the directives of a spiritually enlightened conscience.

Lacking these directives, Dr. White's compassion for human mental suffering and his pursuit of scientific knowledge of mental phenomena have led to flagrant interference with the consciousness of animal life and a lamentable increase in the total suffering of creation. He has produced living chimeras—disembodied canine brains transplanted within the carotid-jugular circulation of recipient dogs, and disembodied monkey brains kept alive and functioning in an isolated state. In establishing primitive communication with

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the isolated brain, he has stated that it "displays a remarkable retention of inherent electric rhythmicity that strongly suggests it may retain some semblance of 'consciousness.'" The scores of remnants of mutilated creatures that he has kept alive in the laboratory have made the world a worse place for all of us to live in. In choosing his goals and his means, he has denied his evolutionary responsibility to distinguish good from evil and has ignored his faith. For whatever his final authority for his choices, it cannot have been Christianity.

Dr. White has forgotten that the purest form of Christianity and all other higher religions preach mercy, love, nonviolence and gentleness and that these qualities have been the hallmarks of mankind's spiritual leaders in their relations with sentient life. He is apparently unaware of the growing number of Catholics who are confidently working to end the Church's silence on animal experimentation. They know that she cannot be expected "to sanction everything she has not yet formally condemned." Despite such efforts, the perspectives and possibilities of our scientific age continue to blind many Christians to the incongruities between the moral core of their religion and the decisions of science. By cutting ourselves off from the superior knowledge of our spiritual heritage, we fail to see life whole and continue to flounder in ethical confusion and decadence. A theocentric reaction is bound to set in. The intellectual revolt of the young may already presage a spiritual renaissance in which the summit of evolving life will no longer tolerate scientific atrocities against its lower forms. Man is an evolutionary as well as a social animal, and evolution is not a matter of chance. Man needs "to think with the whole of his past." He must at last see, with Plotinus, that as creation aspires toward the Good, it needs increasing unity and harmony in its relationships.

Transplantation biology is concerned with what science considers to be inevitable evolutionary relationships of creatures and their parts. It has partially surmounted the formidable natural obstacles of immunological intolerance and rejection through the suffering of untold numbers of animals. While experimental fusions of their living parts to intact animals have received publicity, it is not generally known outside professional circles that much of the practical success of transplantation biology stems from studies of the mutual physiological effects of the surgical fusion of whole animals in pairs. This procedure, parabiosis (life alongside life), is now a routine laboratory technique and is sometimes even extended "to unite several animals in enforced togetherness." Accepted as a biological necessity, laboratory parabiosis is, in fact, a biological outrage and a violation of the natural relationships of living creatures. In the name of evolutionary sanity, let us leave these things and center our attention upon those relations that can be meaningful for creation.

For the continued existence of mammalian species, biological evolution requires the sexual association of individuals in pairs. The further Homo sapiens advances into his psychosocial phase of evolution, the greater his need for relationships other than those based upon animal sexuality. As it has been wisely said, "centuries of carnal embracement, yet man is no nearer to understanding man." Our crying need at the moment is for a relationship that will give all men, regardless of birth, education or faith, a unified sense of rectitude in their endeavors. We need to come together to communicate more perfectly and to understand that, however many imperfections, sins, and egoistic motives and desires we possess in common, we remain most firmly related by the highest that is within us—by those sparks of love, compassion, goodness and righteousness that come from the spiritual realm. If these divine sparks were to coalesce, we would be able to make right choices, and the interrelations of man with man, and man with animal, would be in accord with the Good to which we are being drawn. Psychosocial evolution is now demanding the emergence of spiritual parabiosis—life alongside life, with the

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highest caring for the lower with the same mercy, tenderness and understanding it bestows upon itself.

Evolving life can therefore no longer tolerate the biological injustice of inflicting agony upon animals to ameliorate and prolong the physical existence of human lives. Brief respites from suffering and death made possible by the ruthlessness of scientists against lower life contribute nothing whatever to the spiritual ascent of mankind. Evolving life has need instead of gentle souls like Saint Francis and Gandhi to show us how to come together to live lives of nonviolence, in joy and peace with the whole of sentient creation. For the meek, strengthened and made wise in their decisions by divine sanction and their spiritual heritage, *shall* inherit the earth.

The choice to abolish the sentient laboratory animal is an evolutionary inevitability and a moral imperative. Were Dr. White to join the forces that are already striving to bring it about, true biological achievement would be his.

II. Antivivisection: The Reluctant Hydra

ROBERT J. WHITE

The humanity which would prevent human suffering is a deeper and truer humanity than the humanity which would save pain or death in the animal.

—Charles W. Eliot

The quotation above from that distinguished intellectual and former Harvard University president, written decades ago, continues to crystallize clearly the basic position of medical science toward the employment of animals in research and teaching. I would state it more simply: the alleviation of human suffering justifies the sacrifice of lower animals. Because this statement is as valid today as it was then, and yet has so little impact on the public conscience, I am almost reluctant to shed the mantle of clinical and professional detachment and take up the cudgels against that ill-defined, elusive Hydra—the antivivisection movement. To a degree, my inertia is also derived from my conviction that medical science has always seemed to assume a low-profile posture in justifying the utilization of lower animals for research and education (as it has so often done with other public health issues); it has invariably waited until one of those vigorous cyclic antivivisection campaigns, using the most advanced techniques in news management, has reached its apogee before attempting to combat the pernicious effects on public and congressional opinion. And then, unfortunately, it has employed almost exclusively its own scientific journals as the instruments for presenting its position to an already prejudiced audience. While the scientific community has lobbied successfully in congressional committees against restrictive legislation directed at medical research, it has neglected to present to the American public its case for the continuation of animal experimentation with sufficient force and clarity to eliminate the ever-present danger of government control of biological research through the limitation of animal availability and experimental design. The intelligent citizenry of this country must be educated not only regarding the already multiple advantages of medical research but, what is more important, the absolute

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necessity of continued proliferation of biological research.

Man, in a sense, has unwittingly painted himself into an ecological corner, and without the opportunity of biological testing in lower animals he may be unable to extract himself from his polluted environment. Acknowledging man's equally wanton disregard of animal life, as he has slowly but inevitably poisoned this planet (to say nothing of our careless attrition of individual species to the point of extinction), I do not intend that this essay should be, by any stretch of the imagination, construed as an indictment of the broad humanitarian movement; quite the contrary, for many of its objectives, particularly in the ecological field, are not only most laudable but fully subscribed to by many within the scientific community. Rather, my proprietary interest here is to emphasize need for animal experimentation in neurological research. As a consequence, my confrontation is exclusively with those societies, collectively known as the antivivisection movement, whose single unifying principle is the almost religiously held tenet that it is morally wrong to use lower animals in medical research and teaching. Professor Saul Bevolson, in tracing the historical development of the antivivisection movement in this country, demonstrates that the movement, while spawned and nurtured by the humanitarian establishment, is, in reality, separate in organizational structure. Dr. Maurice Visscher has felt the necessity of characterizing the antivivisection movement as a spectrum with certain gradations of moral and ethical absoluteness with regard to man's right to sacrifice lower animal life for scientific knowledge and medical advancement. Thus, this philosophical spectrum is anchored at one end by the abolitionist who sees no justification under any circumstances for the employment of the nonhuman animal for scientific study, and at the other extreme by the regulatory antivivisectionists who would place external controls (obviously governmental) on medical research by limiting the type and number of animals utilized, and demanding review of the experimental methods with particular reference to purpose and duplication. Make no mistake, in spite of their highly publicized concern for the housing and veterinary care of research animals, the true thrust of these organizations is directed toward the eventual elimination from medical investigation and research of all nonhuman subjects.

As a concerned scientist and as a practicing neurosurgeon, I am simply unable to plumb the depths of a philosophy that places such a premium on animal life even at the expense of human existence and improvement. It would appear that this preoccupation with the alleged pain and suffering of the animals used in medical research may well represent, at the very least, social prejudice against medicine or, more seriously, true psychiatric aberrations. Regardless of the social or psychiatric shortcomings of the antivivisectionists, it has always amazed me that the biological profession is forced into a position of periodically preparing defense briefs on animal experimentation (unfortunately appearing only in scientific journals) as a result of the Herculean efforts of these societies, while the meat-packing industry, which slaughters millions of animals annually, seldom if ever finds it necessary today to defend its activities.

As I write this article, I relive my vivid experiences of yesterday when I removed at operation a large tumor from the cerebellum and brain stem of a small child. This was a surgical undertaking that would have been impossible a few decades ago, highly dangerous a few years ago, but is today, thanks to extensive experimentation on the brains of lower animals, routinely accomplished with a high degree of safety.

The human brain is the most complex, the most superbly designed structure known. Before it, all human scientific and engineering accomplishment pales. Our understanding of its intimate functions, such as intelligence and memory, is extremely limited. Even the more easily characterized capabilities of sensory reception and motor activity are only now being

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elucidated. Without the use of the experimental animal, particularly a species whose central nervous system is similar to that of man, we simply cannot decipher the mysteries of cerebral performance. Without this knowledge of brain function, we will never be able to develop new and improved methods for the treatment of neurological diseases, so many of which now must be placed in an incurable category. Even today the surgery of the brain is in its infancy, and on many occasions the critical tolerance between success and failure in human cerebral operations is narrow. Yet this gap can be significantly increased through properly oriented research. These serious considerations moved Dr. Harvey Cushing, the eminent brain surgeon, to remark, "Those who oppose the employment of animals for such purposes . . . leave us the only alternative of subjecting our fellow man, as a lesser creature, to our first crude manipulations."

In a more personal sense, I have a score of my own to settle with these misguided societies that for decades have been attempting to confuse the public about the true purpose of animal experimentation by depicting the medical and veterinary scientist as the most cruel of men, seeking every opportunity to visit pain and suffering on defenseless laboratory creatures. The more aggressive of these organizations, which are committed to the total abolition of animal research, have recently installed me as their *célèbre terrible,* monster-scientist, perpetrator of abominable crimes. And thus I join the distinguished company of such legendary scientists as Claude Bernard, Louis Pasteur, Lord Lister, Victor Horsley and Alfred Blalock! Dr. Catherine Roberts herself has already prejudged my work and me by earnestly stating, "The details of his experiments are so horrifying that they seem to reach the limits of scientific depravity." Fortunately, my researches do not stand alone in her sweeping condemnation of medical science, for in the same article she described organ transplantation and profound hypothermia as "life degrading scientific achievements." I am sure that she, as well as other staunch antivivisectionists, would be willing to include in this list: open-heart surgery, control of infection, surgical metabolism and shock studies since literally thousands of animals were sacrificed in the development of these lifesaving techniques. In a sense, condemnation of these achievements amounts to condemnation of the most meaningful advances in medicine and surgery in the last thirty years.

What of our own experiments, which have evoked such vituperative treatment at the hands of the antivivisection press? Here are the "shocking" details.

In 1964, we were successful for the first time in medical history in totally isolating the subhuman primate brain outside of its body and sustaining it in a viable state by connecting it with the vascular system of another monkey or with a mechanical perfusion circuit that incorporated engineering units designed to perform the functions of the heart, lungs and kidneys while simultaneously circulating blood to and from the brain. We were overjoyed since scientists had attempted to construct such a model surgically for the last one hundred years without success. As late as the 1930s Dr. Alexis Carrel, the Nobel laureate, with the collaboration of Colonel Charles Lindberg, had been able to support the viability of almost all body organs in an isolated state with simple perfusion equipment that forcefully propelled nonsanguineous nutrient fluid through the blood vesels of the separated tissue. Only the nervous system, because of its complexity and delicacy, escaped their magnificent scientific capabilities. Parenthetically, it should be mentioned that Dr. Carrel had his problems with the antivivisectionists of his time.

With further refinements in operative technique, perfusion/structural design and blood processing, we were able to demonstrate normalization of intrinsic electrical activity and metabolic performance of the isolated monkey brain for extended periods of time. We now had the methodology to unlock many of the subtle mysteries surrounding cerebral function that heretofore had resisted all attempts at solution because of the difficulties of neurogenically

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and vascularly isolating the entire brain *in situ*. What is perhaps of greater importance in terms of understanding and treating neurological disease, we could now easily impose on our brain models abnormal clinical states such as infarction, circulatory arrest, infection and malignancy with absolute control of environmental circumstances and with a real hope of elucidating their effects on brain tissue alone. Once the characteristics of these states were defined, these same models would be of inestimable value in developing new and meaningful therapeutic regimens aimed at eliminating these clinical disease states.

As we set about exploring and documenting the capabilities of the isolated brain in an atmosphere not unlike the conditions described for the fifth level in Michael Crichton's book, *The Andromeda Strain,* we gradually became aware of a growing public interest in the preparation, an interest that intensified after our success in transplanting the brain in the experimental animal in 1966. A succession of competent medical journalists visited our laboratories and subsequently prepared a number of highly informative and reasoned articles dealing with our investigative efforts. I personally have always approved of this kind of interchange. In spite of our best efforts to assist in the preparation of the textual material, however, an unreviewed and unauthorized article written by Orianna Fallachi appeared in *Look* (November 28, 1967), in which this well-known interviewer attempted to humanize the monkey by depicting it as a small child. This single article (or lengthy excerpts from it) has now enjoyed world-wide publication and translation. Besides her treatment of the monkey as a small patient, Miss Fallachi's detailed description of the preoperative preparation (including the induction of anesthesia) and her vivid portrayal of the isolated brain model apparently struck a sympathetic and responsive chord among the membership of the antivivisection societies in this country as well as throughout the world. Like Mary Shelley, Miss Fallachi had created a Doctor Frankenstein and an up-to-date monster, at least as far as the antivivisectionists are concerned. True, this tale has its amusing—if not outlandish—elements, but its overall effect is tragic, since Miss Fallachi's creations are not only as factitious as Mary Shelley's, but in reality the direct antithesis of the Frankenstein legend.

Admittedly, the nervous system is the most difficult body organ system to investigate, not only because of its intrinsic complexity but also because, somewhere within its billions of cells and fibers, pain and suffering are represented. For this reason, the neurophysiologist is, on occasion, unable to avoid producing some discomfort in his animal when he is specifically studying pain in any or all of its complicated ramifications within the neural system. Actually, the isolated brain model is completely denervated by virtue of the fact that all pain pathways have been surgically severed; consequently, this brain model enjoys a completely painless existence by all known physiological criteria.

Since the isolated brain is incapable of perceiving these modalities, one can only wonder at the creditability and objectivity of the antivivisection prose, which has been so uncomplimentary in its descriptions of this subhuman research model.

The nervous system—the repository, so to speak, of pain and suffering, but, more important, of the qualities and capabilities that uniquely distinguish an organism—is most critical to this discussion since direct surgical or electronic manipulation or chemical modification of this system in the experimental animal offers to the antivivisectionist the most logical area for condemnation of biological research. At issue here would not be the indiscriminate infliction of pain and suffering (these experiments are basically free of pain), but rather purposeful alteration of the innate behavior of the organism in order to advance our knowledge of emotion, memory and intelligence, with the final phase again being the interpretive extrapolation of this information to the human and to human mental functioning. As yet we have heard little from the antivivisectionists regarding the inappropriateness of these experiments with

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reference to animal welfare. It may be, however, that their historical fixation on the "twin sins" of pain and suffering in neurological investigation has blinded them to the realities of modern experimental research. Just as I must vigorously dissent from the antivivisection philosophy (and the belief of certain physiologists) that the production of some pain, no matter how minimal, is never justified, so too I cannot conceive of the development of a valid argument opposing behavioral research, if only for the simple reason that mental illness cannot successfully be treated until mental performance is understood.

To circumvent the employment of nonhuman animals in medical research, the antivivisection movement has recently turned for assistance to science itself. It has been suggested that many of the physiological and biochemical studies conducted on animals could be programmed for computer analysis and thereby reduce and eventually eliminate the need for the living experimental preparations. Actually, computers, since their inception, have been used in biological research and, with their growing complexity, have markedly extended the frontiers of investigation. If anything, computer availability has contributed to the increasing demand for animals for research.

An equally unrealistic approach to the elimination of animal experimentation has been based on the cell culture work of Professor Sureyat Aygun, Director of the Bacteriological Institute of the University of Ankara, and a leading antivivisection proponent. The theory here is that, with proper culture techniques, cells or embryos could eventually be developed into entire organ systems. The technological advances and expense necessary to accomplish such a program to replace present-day animal research facilities are unachievable. There is no more need to seek alternatives to the use of lower animals for medical research than to search for nonflesh substitutions for meat in our diets. While it may well be true that ecological "facts of life" could eventually require the elimination of certain endangered species from both the laboratory and commercial market, there is nothing to suggest that some suitable species cannot be substituted. Even Dr. Albert Schweitzer recognized in his own unique philosophical scheme of things that scientific experiments with animals were necessary for the alleviation of human ills.

The American public demonstrates its overwhelming support of medical research by annually contributing millions of dollars through direct federal financing and private subscription; yet this same public is tragically unaware that progress in medical science is continually threatened by the antivivisection movement. At the urging of a small but determined group of antivivisectionists, the United States Congress is constantly considering legislation that, if enacted into law, will seriously restrict the freedom of individual scientists participating in medical research, in the same way that laws have so seriously hampered similar research in Britain. Since, through research grants to qualified individuals and institutions, the federal government provides the major financial support for medical investigation in this country, all laws affecting the conduct of such research are of paramount importance to the health of the entire citizenry. Unless American medicine and its allied biological professions cast off their mantles of detachment and undertake the responsibility of educating through established lines of communication our citizens to the necessities of medical research, the antivivisection movement may eventually win the day.

In the final analysis, there is no way that I can personally resolve or even arbitrate the impasse that exists between the theology of the antivivisection movement and the immutable stance of practicality maintained by biological research, since like R. D. Guthrie, I believe that the inclusion of lower animals in our ethical system is philosophically meaningless and operationally impossible and that, consequently, antivivisection theory and practice have no moral or ethical basis.

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Dr. Roberts Replies:

My thanks to Dr. White for his contribution to this debate. Since our rebuttals must be held within definite limits, I shall first point out a few misconceptions and errors of fact in his paper that are not fully covered in mine and then pass on to a more general refutation of his arguments.

1. He says that antivivisectionists are preoccupied with the "alleged" pain and suffering of laboratory animals. This statement is misleading. To allege is to assert without proof; yet biomedical journals abound in observations of experimentally inflicted pain and suffering in animals upon which antivivisectionists can base their claims.

2. He writes that behavioral research involving electrical, chemical or surgical interference with the nervous system to acquire knowledge of animal emotion, memory and intelligence for extrapolation to human mental functioning is "basically free of pain." This statement is incorrect. Experimental alterations of animal behavior, whether for medical, pharmacological or psychological purposes, are frequently associated with what scientists choose to call "discomfort." A. Mosfeldt Laursen's experiments on feline behavior referred to in my paper can hardly have been painless. Electrical stimulation elicited salivation, lip-smacking, head and shoulder twitching, mewing, sniffing, hissing and gagging; intensifying the current to produce brain lesions led to apathy and diminished fright. To take another example, E. D. Weitzman and G. S. Ross, also working on the electrical manipulation of the nervous system, described with masterly objectivity the screams of tortured animals as "high-pitched vocalization" in a paper with the revealing title, "A behavioural method for the study of pain perception in the monkey."

3. Erroneously concluding that pain and suffering tend to be absent from behavioral research, Dr. White is led into the further error that antivivisectionists are of the same opinion and are therefore loath to condemn it. This is a misconception based on ignorance of the facts. In 1967 H. F. Harlow's psychological research on anthropoid emotion based on protracted solitary confinement of Rhesus monkeys was criticized for both the suffering involved and the irrelevancy of applying the results to man. Today, in this time of ecological crisis, there is a growing awareness that the suffering man inflicts upon animals comprises many forms; religious circles, in particular, are discussing the rights of animals to participate in activities natural to their kind—rights that, even with adequate food and shelter and freedom from disease and physical pain, are denied them under the artificial conditions of the laboratory. Even some biologists have protested against the cruelly frustrating confinement of livestock in factory farming but so far have characteristically failed to condemn the similar plight of the confined laboratory animal.

4. It is only surmise that antivivisectionists are generally unconcerned about the slaughter of animals for meat production. Many antivivisectionists, subsisting on a salutary fleshless diet, are actively demonstrating how unnecessary the carnivorous state is for man.

5. Although Dr. White correctly points out that antivivisectionists may differ over means and goals, he is not correct in implying that they are fully agreed that the biologist's freedom should be curtailed by legislation restricting the use of laboratory animals. Opposition to this view was raised some years ago: ". . . further restrictive legislation would only prevent many scientists from doing what they now earnestly desire to do"; ". . . the medical scientist who employs experimental animals will one day have acquired sufficient subjective humaneness to realize that the most desirable world, now and forever, is built upon spiritual insight—and it will then be his own sense of moral responsibility, rather than external restriction, which will reveal to him when it is time to stop." These thoughts fell upon barren ground at the time, but the intellectual upheavals of the past five years have produced a radically new mental environment more favorable

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to the growth and dispersal of ideas centered upon the problem of good and evil. And here we come to the basic issue under debate: the present state of the scientific conscience. With respect to biomedicine, Dr. White holds that it is in a healthy, flourishing state, in no need of improvement. I hold that it is in crying need of profound renewal and reform. His refusal to include either sentient animals or antivivisection arguments in his ethical system echoes the supposedly immutable claim of established biology that its further advance depends upon the continued exploitation of subhuman life. Based upon ignorance of the evolutionary forces now at work, this claim reflects a state of conscience out of step with the new biology already in the process of creation.

Open discontent with established biology as an adequate science of life is mounting—a development closely related to our present ecological interests in the reality and potential of life in all its associated forms. The frustratingly inadequate reality of contemporary human life, pointing directly to man's unrealized potential, is leading to ever greater ethical dissatisfaction with human endeavors that seem to impede our approach toward the ultimate reality of the Good. Scientific endeavor in an ailing scientific age is naturally wide open to criticism. Recognizing that modern science is now on the defensive and sympathizing in varying degrees with the attacks upon its irrelevancy, amorality and immorality, experimental biologists are coming together to question the automatic expansion of science, to plan worldwide moratoria on research, to weigh the threats of science against its promises, to define the scientist's moral responsibility, and to discuss scientific methods as well as goals. Some, in moral protest, are dropping out of the scientific establishment altogether. For the first time in the history of science, biologists are earnestly examining their consciences and questioning the kind of biology that Dr. White is defending. As yet, their number is small, their aims uncertain, their methods hesitant. They are nevertheless creators destined to succeed. For the creation of a new biology that sees life in terms of human values and the choice between good and evil is a part of the evolutionary ascent.

The new biologists, no longer satisfied with the supreme authority of established science, are striving for a higher ethical vision and a purer conscience than their predecessors had. They will hardly find it in the dogma that the ends justify the means, whether it be held by revolutionary colleagues intent on changing the established order by force and violence or by scientific colleagues intent on acquiring new knowledge by any effective methodology. The new biologists will be unable to approach life as did Claude Bernard, Alexis Carrel, or other scientists who chose to profane mercilessly the innate potentials of sentient beings in the belief that all biological ends and means deserve evolutionary sanction. Condemnation and rejection of such scientific ethics may not suffice for biology's complete change of mind and heart; some sort of associated regret or remorse—what the Greeks called *metanoia*—for biological violations already committed may also be required. So far animal experimenters have shown little inclination to admit that their vision and conscience have been at fault. Whether Carrel's growing religious insight finally caused him to repent his experimental research, I do not know; his mature views on the future evolution of man show no more understanding of the true man-animal relation than do his very revealing early letters to Guthrie, and thus express a lack of perception at variance with the new biology.

For the new biology, perceiving that the realization of man's potentials is forcing him into a new relation with subhuman life, is seeking spiritual counsel. Much of what it seeks lies in our neglected heritage of theocentric humanism where enlightened men of the past strove to know themselves and to become real through moral aspiration. The new biologists will also find spiritual truths about evolving life in unexpected contemporary places. As the theologian, G. F. Woods, has written, "The quest for moral perfection is far more

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than a quest for private excellence. It involves the attainment of right relationships with God and with our fellow-men. And it includes a right relation of recreated humanity to the natural world." To secure this right relation the new biology must renounce both the Carrelian and the Teilhardian evolutionary visions of unlimited quantitative expansion of science by all conceivable means. The new biology must have a higher and purer theocentric vision: in gentleness, mercy, humility and self-restraint it must limit its advance to qualitative expansion.

Nothing can stop its further emergence as the human race approaches reality by bettering itself and its relations with the rest of sentient creation. The new biology is part of the conscience of evolving life reorientating itself toward the Good and turning ignorance into self-knowledge so that man can spiritually surpass himself in accordance with the divine will. The ethical system of established biology is a gross deflection from the Good and is destined to be replaced by biological righteousness. Sentient animals in the laboratory are not there to stay.

Dr. White Replies:

I was fascinated by Dr. Roberts' paper, finding it a revelation of a sensitive scientist's inner self and her personally evolved theological and philosophical matrix of belief rather than merely the expected sterile recitation of the well-known "sins" of vivisection. True, her employment of the Platonic concept of *Summun Bonum* (The Good) seems to be overly simplistic and clearly self-defeating in her attempt to construct a theological edifice with which to blunt and smother the onslaught of biological science and technology; still, her recognition of the need for scientists to come to grips with the far-reaching effects of their researches, particularly on human life, must be complimented. I must also admit, however, to a certain sense of *déjà vu* in reading this presentation since the substance has been similarly developed in her previous publications.

To assist myself in arriving at a reasoned judgment of this particular Roberts manuscript, I took the liberty of forwarding a copy to the Jesuit theologian, Father Nicholas A. Predovich, of John Carroll University in Cleveland, for a learned opinion regarding the religious implications of Dr. Roberts' thesis, since my expertise in theology extends only to the theology of ancient Egypt. In addition, I permitted myself the luxury of taking the document with me to the Soviet Union last fall in hopes that my commentary might at least be distinguished by having been composed at twenty-five thousand feet in Soviet airspace and under a certain psychological and physiological stress, since I do not enjoy flying in Russian aircraft during adverse weather conditions.

Before attempting to review the paper, I must state that the evidence at hand strongly argues that Dr. Roberts' true purpose in seeking this "exchange of opinions" was not with a view toward settling the issue of vivisection but was rather of a grander design, to provide herself with another distinguished forum from which to amplify her personal religious philosophy and again offer it as a solution to the problems developing for mankind from the ever-increasing number of scientific discoveries. But these are problems of human existence and survival, not of animal survival. Consequently, her entire thesis seems hardly germane to the subject of vivisection, and one is hard pressed to uncover the link between her pseudoplatonic theology and animal experimentation. Perhaps both Dr. Roberts and I owe the readers of this journal an apology for having consumed so many pages in discussing a topic of such little relevance today.

To clarify the "ground rules" of our individual literary efforts, I must take issue with her in regard to an alleged agreement between us to address ourselves to animal experimentation in the "widest evolution-

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ary, social, ethical and religious perspectives," since it is obvious from my presentation that I was and am unable to conceive of animal experimentation in terms of human values. There simply is no historical, evolutionary, biological, philosophical, social or theological justification for applying principles of human morality and ethics to nonhuman creatures. Admittedly, the entire scientific community does not universally ascribe to my opinion. Nevertheless, R. D. Guthrie has recently demonstrated the impossibility of including animals in our human ethical system.

Since Dr. Roberts' thesis rests so heavily on her personally derived Platonic theology, I have taken the liberty of quoting directly from Father Predovich's critique of her religious and philosophical theories as set forth in his communication to me.

In reviewing Dr. Roberts' manuscript, Father Predovich is disturbed by the lack of a clear definition of what she means by the word *life* since it obviously forms such an integral part of her argument. Indicating the importance of distinguishing between an *univocal* and *analogous* concept of life, he writes:

> If Dr. Roberts has a *univocal* concept of life, then all forms of life such as vegetative, sentient and rational should be preserved and fostered as much as man can make them. If life is only one thing, then what makes the vegetable and the animal different from man? If we must conclude that life is an *analogous* concept, that is, somewhat the same, yet totally different in the plant and in the animal and in man, then shouldn't we, as rational beings, see that different principles will apply differently for each of the forms of life?

Surely one recognizes the *univocal* concept of life as peculiarly Schweitzerian, and yet even Dr. Schweitzer admitted to the necessity of animal experimentation for the betterment of mankind.

I was disturbed by Dr. Roberts' concept of conscience and her denial of man's personalistic character, and so was Father Predovich. He continues:

> To speak in terms of conscience and the human being using his conscience, confuses the issue and makes conscience purely a mechanical process based on one's own insight into the reality that is labeled evolution. Rather, conscience looks to the whole of reality, to history, to the insights of other human beings, and is formed from all of this. Conscience is a process that results from integrating many things. It does not appear that C. Roberts would agree with this notion of human conscience.

In spite of appearances, this paper by Dr. Roberts lacks insight into the human condition as *personalistic*. Homo sapiens seems to be treated like a scientific phenomenon rather than an existential "I-Thou" reality, which he is. If, as Martin Buber proves so well, man is destined to deep, free, open, interpersonal relationships with other men, then obviously, even in the evolutionary process, man's greatest effort will be to effect, to help grow, to urge into becoming such interpersonal relationships. The preservation of biological species, though worthwhile per se, is itself subordinated to the highest form of evolution of man, that is, evolution into interpersonal relationships with all men, and finally into the total human community with God. This is the Omega Point that I think Teilhard de Chardin was talking about rather than a mere evolutionary process of a human species.

Eventually Dr. Roberts' theological balloon returns to earth with a predictable thud, since she immediately undertakes to overwhelm us with her prejudicial descriptions of various animal experiments, notably in the fields of behavioral psychology and parabiosis. Those tried and trite words, cruelty, screams, torture, pain, suffering, mutilation, *et cetera,* that form the litany of the antivivisection language begin to appear with increasing monotony. I can only assure the readers of the SCHOLAR that I have participated for over two decades in animal research in all the areas she so selectively portrays (behavioral, neurophysiological, parabiosis and organ transplantation), that I have visited institutes for experimentation all over the world, including the Soviet Union and other Iron Curtain countries, and have not witnessed the cruelty or dehumanization that she insists characterizes biomedical animal research. True, some discomfort may be experienced by animals during specific studies, for example, in pain research, but almost invari-

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ably the investigator goes out of his way to eliminate all vestiges of suffering, not only because they may affect his scientific results but, more important, because of his innate sympathy for his experimental subjects. Dr. Roberts repeats with relish the often-used phrase of antivivisection literature, "dehumanization" (of the scientist participating in animal research). This should obviously be classified as a psychiatric syndrome. Fortunately, psychiatric literature and I are ignorant of this spectacular clinical diagnosis—since it does not exist.

I share Dr. Roberts' worry regarding the serious impact on human existence of recently acquired biological knowledge, and, fortunately, she is correct in emphasizing the growing concern within the scientific community itself over the implications of its own research. The awesome capability of biomedical science to modify and qualify human life in the immediate future will be a reality if the same momentum, so characteristic of its present state, continues. The recent works of Albert Rosenfeld *(The Second Genesis: The Coming Control of Life)*, Alvin Toffler *(Future Shock)* and Gordon R. Taylor *(Biological Time Bomb)* are devoted to this topic, and while the authors' judgments are somewhat visionary, nevertheless they collectively emphasize that life as we know it today will be radically altered in the very near future. Unfortunately, this truly crucial question has nothing to do with the subject under discussion here—vivisection.

I must remind Dr. Roberts that our advanced technological society and increasing population have produced additional serious health hazards through industrial and human pollution of our air, water and land, and that the use of animals to establish acceptable levels of biological contamination and to design methods of control and decontamination for humans represents a new dimension of biomedical research that may prove to be utterly crucial to human survival.

In her final paragraph Dr. Roberts kindly invites me "to join the forces that are already striving to bring it [abolishment of laboratory experiments with animals] about," stressing that if I did: "true biological achievement would be [mine]."

Dr. Roberts cannot be serious in arguing that the elimination of animal experimentation carries a priority equal to or surpassing the need for meaningful solutions of the major problems developing or already existent at the sociological-biomedical interface! I am afraid that I cannot join her "moral" crusade since I cannot even grant vivisection a position of relevancy; but, what is more important, I consider the employment of animals in biological and medical research so critical to continued human existence and survival as to be beyond logical challenge.

Getting Religion

I am the vessel,
you are the wine,
we are the body,
the Kingdom Divine.

ELLIOT ABHAU

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Letter from Europe

ANTHONY BURGESS

This is the second time in a year that I have to record shame at the untruth of my heading and to resort to the casuistry acceptable from Jesuits and governments but detestable in free individuals well able to drop compromising assignments. For I am still in New Jersey and remarkably cut off from Europe—especially, because of the long strike of the British postal workers, that part of Europe I know best. I remain, of course, a European, but I have spent a semester or so meeting many Americans far more European than I, men and women with luscious phonemes drenched in the Bosphorus and the Baltic, or bleats learned in Oxford colleges, whose U.S. passports carry them to the very citadels of structuralism, parasemiotics and musicosemantics. To be a citizen of the scholarly world you must first, nowadays, be an American. I recognize that I will never be an American, even of the merely passport-clutching kind. I am not even one of the new Euro-Anglians. My fight against the introduction of a decimal coinage into Britain has been, as it had to be, in vain: the organization I belonged to, dedicated to keeping British money as it was, was invaded by mad octalists, duodecimalists, and even a fierce septist sect (not so insane, really, when you consider that most Britons are paid by the week). We fought with each other too much; the decimen prevailed with no difficulty. This sojourn in Northeastern America is serving to harden my resentment chiefly because it is forcing me into the role of one of those Englishmen depicted in the Gordon's Gin advertisements —conservative, imperialist, a comic fossil. It amuses my students, and there is no harm in it. I am expected to say *tomahtoes* and pronounce the aitch in *herbs;* I am expected to preserve a kind of mint-flavored, old-world courtesy in this casual, slangy ambience.

I understand American usage very well, although frequently I pretend not to in order to force the users into thinking out and explaining such tropes as *uptight* and *cop out* and looking for the etymologies of *rap* and the universal greeting *hi. Hi* is, I think, the one seasoning of American life that I cannot accept, although I find it hard to give a reason. Perhaps it's British reserve, or something. *Hi* is too casual, so familiar that it has overtones of contempt, of the same phatic family as *friends* or *folks;* it sounds like a mockery of an Amerindian greeting or the password of some such preposterous society as the Elks or Water Buffaloes. I have devised various responses to it, such as, "Are you really? What on?" and "six feet one inch, to be precise" and "'lo." I'm not too keen on *wow,* either, although the Yale professor who is called the "Third" Reich thinks highly of it and, indeed, makes it the chief vocal expression of Consciousness III ecstasy. The lady who wrote *The Sensuous Woman* likes it, too. Her recipe for what I suppose has to be called penilambency involves the coating of the member with double cream, coconut and icing sugar (she has a low-calorie alternative for weightwatchers). The first tongueful brings an ejaculation of "Wow!" (On second thought, is it "Mmmmmmm!"? I expended part of the paperback during a

✪ ANTHONY BURGESS' most recent novel is *MF.*

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bathroom-tissue shortage.) The vocable, anyway, is regarded as proper for all expressions of pleasure, from smoking Kent to understanding Kant, with special emphasis on another commodity associated with the ablaut gradation. This is not right: one needs an ejaculative hierarchy.

It is the lack of a speech hierarchy or of a received standard pronunciation that is upsetting my small son, who is in the first grade of a Princeton public school. (Talking of cigarettes, I had better record that he recently said, "Princeton wastes good." This is *not* apocryphal.) America is teaching him to read, but he is confused by the wide allophonic choice available to the vowel letters. How is *man* to be pronounced? He hears /man/ and /mæn/ but also something like *meyern* (I avoid the International Phonetic Alphabet since I can't type a schwa). What is the correct pronunication? *Is* there a correct pronunciation? Is there such a thing as substandard pronunciation in a classless society? Reply, reply. Although better used to American speech than he, I still have difficulties with the tendency, common everywhere, to voice an intervocalic plosive that, in British English, is unvoiced in speech as well as spelling. Take *writer*, for example. At a cocktail party I talked with a young scholar who had been doing research on Dr. Johnson in the British Museum. "What aspect of Johnson?"—"Dr. Johnson as a rider."—"Ah," (after a pause) "what a good idea. Eliot used to talk of the influence of the internal combustion engine on modern verse rhythms. Probably equestrian rhythms are important in the work of pre-motor writers." And so on, until my auditors exhibited back-fillings in speechless awe. Then I realized, then I slunk away to join other company.

While we are, or I am, on this language question, I'd like to draw attention to a piece of matchcover prose that many American scholars may have missed, however much they may be familiar with the franchise exotica of Trader Vic's. I have had many a drink in Trader Vic's, which brings the delights of the South Seas to places like London, Chicago, Denver and even the South Seas. I have puzzled, the puzzle becoming a torment as the consumption of chi-chis and mai-tais increases, over the following, which is printed inside Trader Vic's matchbook:

> Where those merry souls who make drinking a pleasure—
> Who achieve contentedness long before capacity
> And who, whenever they drink, prove able to carry it, enjoy it,
> And remain gentlemen.

All right, take that whole group as an adjective clause qualifying some such statement as "This is Trader Vic's." Now, what is the main verb governed by "those merry souls"? Is it "enjoy"? If so, this must be one of the subtlest constructs in all matchbook literature, since a finite verb is camouflaging itself as an infinitive. It has always had the effect of making me drink more in Trader Vic's than I at first intended: morphological confusion as a selling device, a change from connotative saturation.

I apologize for this temporary concern with linguistic trivialities, but I have been engaged for some time now on what is termed Creative Writing, and the poring over subtly unsatisfactory pieces of writing or riding has become a daily occupation. Despite Mr. Hiram Haydn's achievements in this field of parapedagogy, I don't think Creative Writing really exists as a subject. With my younger students I have the impression that I am an aged outsider, foreign moreover, who is incapable of appreciating little poems produced with great pain—a high virtue—or—a higher virtue still—in something like mindless automatism, poems that turn on coeval co-institutionists and make them cry "Wow." When I give advice on prose structure, on the management of dialogue or crowd scenes, on ways of making characters recognizable on their second appearance, or twenty-second, I am accused of bringing "trickery" into the grove of art. But art is precisely trickery, a mode of conjuring: this, my loftier younger students are unwilling to accept. I am speaking of Princeton, where Creative Writing is a kind of sideshow; at Columbia, which I visit once a week, the more bracing winds of commercialism strike

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keenly, my students are published novelists or short-story writers, and the discussion of a limp metaphor or contused phrase has relevance to a great tough audience, actual or potential, honking out there through the streets of Manhattan.

There is, moreover, an atmosphere of real eighteenth-century Grub Street swirling around Amsterdam Avenue and 110th. A fair number of my Columbia students have been mugged by the new Mohawks, and I myself once had to brandish a heavy stick in counterthreat (this, though, was down near 13th Street). On these weekly visits I enter Modern American Urban Life with a vengeance. Let no one, seeing me swelter on the I.R.T. train, which has been immobile between stations for forty-five minutes, or dodging axes or coshes, or vomiting after a twenty-five-cent pizza on uptown Broadway, talk about ivory towers or the Groves of Academe. Inevitably, this tough world is at the center of most of the New York Creative Writing I read, and there is often more of it in the work of the girls than that of the men. How, I sometimes think in my old-world old-fashioned way, can these sweet young writing misses bring themselves to use such words, show such intimate knowledge of such remote sexual deviations? Rape and almost ecstatic obscenity are nowadays openly exploited in the very first paragraph, leaving nothing for the final one but some drug-induced vision of hell. Can Creative Writing, or creative writing, go on much longer in this way? When is the new puritanism coming?

I had expected, when I came to live a year in New Jersey, that my trips to New York would be very frequent. With all its faults, New York is a most visitable place, with a lot going on, and the people are warmer and more communicative than they are in New Jersey. But the journey in and out is tiring, and each evening tends to be spent at home, taking in America vicariously through the color television. Although color-blind, I like color; it beats thermally out of the tube at me, heartening as a vapor rub. The programs I like less, and it is the quality of the TV output that turns me from a good guest of America into a snarling ingrate. I don't object to Old Movies; I positively dote on them. But I object strongly to the arbitrary "editing" that maims classics of the nineteen thirties, and later for that matter, sometimes turning them into gibberish. I am thinking particularly of a recent rerun of *A Tale of Two Cities,* with Ronald Colman, Edna May Oliver and all, in which the storming of the Bastille had been arbitarily removed and Sydney Carton awaited the guillotine for no very clear reason. *The Citadel,* a very good film of the thirties, was made to begin somewhere near its true middle, perhaps so that a magnificent piece of obstetric realism at the true beginning should not disturb the, God help us, "Ladies' Day" audience with too much truth.

I consider that America should be abysmally ashamed of its television programs. NET, I know, does much good but it is not universally receptible: in my temporary New Jersey hollow it is a mere bombardment of electronic snow, while the NBC and RKO drivel shines in clear and idiotic as the moon. When is some great federal corporation, financed out of license fees, going to take over the task of adult communication in this important medium? The answer—*never*—is symptomatic of the disease of timocracy that is at the root of most of America's troubles. But I must turn myself back into a harmless guest and reserve criticism for my Creative Writing classes.

Let me now snarl at a British god rather than at an American oracle. The recent British drama series, *The First Churchills,* put out by NET, prompts me to say, with no expectation of a shocked response, what, to a very shocked response, I said recently in a television discussion—namely, that the late Winston Churchill was not such a hero to the British public as he apparently was to the romantic middle class of America. I note, rereading Edmund Wilson's *Europe without Baedeker,* that the well-informed Great Anglophobe himself was capable of surprise, at the end of World War II, to discover that ordinary tommies and erks had no great love of the cigarred, V-signing, bricklaying, hard-swearing aristocrat who Understood the People. Church-

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ill's astonishment at not being reelected in 1945 is a sufficient index of his political naïveté: he did not after all, it appeared, really Understand the People. The bulk of the People were still in uniform after six years, and they heard, in his election addresses, Churchill's proposals that the uniforms should be kept on even longer to face the new menace from beyond the Iron Curtain. To promise an amateur army more time in the army was a mark of great political ineptitude. Political leaders reveal their untrustworthiness in small but significant ways. Soldiers dying for a cigarette made even out of camel droppings were not pleased by the Havana aroma that enveloped the Great War Leader when he came to encourage the troops. The class division of Britain has never been taken sufficiently seriously by Americans, and Churchill was plainly a spokesman for the upper classes, not for the great sardonic heart of the lower orders. If Churchill had cared much for the latter, he would have smoked Woodbines and complained about the difficulty of getting them.

I remember, some years ago, seeing the late President Nasser preside at a press conference, with the movie cameras of the whole world upon him. A white-coated underling brought on iced water and poured His Excellency a glass. He was rewarded with no word of thanks, no nod, not even a token sip of acknowledgment. This was very bad politics. It is always stupid to show that, for you the leader, the lower orders have no importance. American presidents go out of their way to eat the donated peach pie of humble men, even if peach pie makes them gag. The people they tend to scorn or ignore are the intellectuals. I was interested to hear President Nixon announcing an antipollution program and using as an exordium some lines out of Eliot's *Murder in the Cathedral:* "Wash the air, wash the wind . . . The land is foul, the water is foul . . ." President Nixon said: "That is what we aim to do." It is a pity that he had not been told what comes just after in that same chorus-speech—a reference to "our beasts and ourselves" being "defiled with blood."

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Miss Arendt, Violence and the Universities

ALVIN C. KIBEL

Hannah Arendt's latest book, *On Violence,** is a model of the sort of disciplined commentary that a systematic concern with a subject can provide when the times offer an apt occasion. One might go down the list of her books and tick off themes informing this one: the idea of the public space as an aim of politics *(The Human Condition),* the loss of authority and tradition *(Between Past and Future),* the internal decay of power as the result of violence *(On Revolution),* the banality of evil *(Eichman in Jerusalem).* Not that *On Violence* requires these references; it is perfectly straightforward and contained in its own right. But it does afford the pleasure of seeing how the impulse of thought to extend at the behest of its internal pressure can lead to relevant commentary, how the effort of independent system-building, generally abandoned by philosophers today as cranky and perverse, can provide balance and control in a dark time.

The fact that Miss Arendt pays more attention to the situation of the universities than she does to the conduct of the military in Southeast Asia should not mislead the reader about her sympathies, which are quite clear. Not only is the student movement perfectly disinterested, fulfilling Péguy's prophecy, "The social Revolution will be moral or it will not be," but its membership seems everywhere to be characterized by sheer courage, by an astonishing will to action, at least where comparison with their elders is concerned, and by a no less astonishing confidence in the possibility of change. All three give it a kind of moral authority that the previous generation did not possess, and that cannot be reduced to the reflexive effect of permissive training in America and overstringent upbringing in Germany and Japan. The student movement is a global phenomenon, having behind it the knowledge of the extermination camps and of the fact that modern military operations are no longer possible without the massive slaughter of civilian populations. Somewhere, too, there is consciousness of the Bomb—and the perception, clearheaded or otherwise, that more and better scientific or technical expertise cannot halt the mindless proliferation of technology or undo the disastrous consequences of its immediate effects, that this is a political problem, connected with the imbecile size of our social system, and requires political solutions. For just these reasons, however, it is important to see in what ways the new generation is not self-created, as its proponents often seem to claim, but a product of the world that they oppose; and the university situation provides an obvious focus for doing so.

The concern of Miss Arendt is not just, or even mostly, with the resort to violence that has always characterized political man, but with the extent of violence today and particularly with the way in which its ubiquitousness has corrupted the moral imagination of radicalism. As it happens, she cares about the survival of the universities, as places for the disinterested pursuit of theory. The continued existence of the university as an institution (like constitu-

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ALVIN C. KIBEL teaches literature in the department of humanities at the Massachusetts Institute of Technology.

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tional democracy, a creation of the *bourgeoisie*) is absolutely demanded by her view of society, and the present peril into which it is brought by the violence of government and radicals alike is cause for alarm.

> It is perfectly true that the universities will not be able to survive if "intellectual detachment and the disinterested search for truth" should come to an end; and, what is worse, it is unlikely that civilized society of any kind will be able to survive the disappearance of these curious institutions whose main social and political function lies precisely in their impartiality and independence from social pressure and political power.

Miss Arendt is perfectly aware that the politicization of the universities, usually blamed upon the students and the radicals, is actually the cumulative effect of a number of factors, none exactly conducive to the "disinterested search for truth" (the phrase is Chomsky's), and all of them in operation long before the Berkeley Free Speech Movement or the Port Huron Statement. The latest and most glaring instance, preceding the formation of radical cadres among the faculty, is the support that the university has lent for some time through the administration of government funds to military research, pacification studies and "defense" weaponry (the act of rechristening the War Department has made everything easier to name)—all customarily defended by their campus supporters in the name of academic freedom. It is worth remarking that, as a principle, academic freedom was traditionally invoked to protect the right of the accredited scholar to make public his conclusions and cannot be used to defend classified research without considerable wrenching of its substance. That it *is* so used, to protect the scholar's election of any line of inquiry, hence as a catch-all apology for going where the money is, is the sort of debasement of the notion of freedom that Miss Arendt is attacking.

As long as universities are run by businessmen, their prosperity is figured in economic, not in intellectual, terms. This poses a general problem much larger and older than the presence of military research on the campus; it has to do with the direction of its intellectual life. The chief difference between the radicals and Miss Arendt in their awareness of this is that for her the politicization of the universities at the hand of "the established powers" is a disaster and not an opportunity. In meeting the threat of politicization the radicals seem to embrace it. The hallways, the offices, the buildings, the tenure of its professors, even culture itself—all belong "to the people," which is to say that their status as property is conceded but assigned another ownership, whereas for Miss Arendt, the autonomy of the university is a recapturable goal that needs to be constantly in mind, even where rhetoric is concerned. She cites, for example, a letter by Staughton Lynd to the New York *Times,* in which Lynd defends the tactics of student radicals by comparing them to the tactics of labor during its militant phase, and she comments:

> It looks as though Lynd has accepted a university image, unfortunately not unfrequent among trustees and administrators, according to which the campus is owned by the board of trustees, which hires the administration to manage their property, which in turn hires the faculty as employees to serve its customers, the students. There is no reality that corresponds to this "image." No matter how sharp the conflicts may become in the academic world, they are not matters of clashing interests and class warfare.

There is no reality corresponding to the image, that is, so far as any sensible idea of the university is concerned: Miss Arendt's notion of what a university is in fact, of what it must be taken for if the word "university" is to have meaningful application, issues from a systematic understanding of the political life and of the possible function of institutions within it. This is not idle Platonism: it has to do with the way distinctions must be drawn in theory and adhered to in speech if the varieties of possibility are to be open to thoughtful consideration.

In the present case, the autonomy of the university is implied by its publicity of research, its establishment of a curriculum, and its education of students, a trifold responsibility the issue of which is the accession of a body of truth not otherwise ob-

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tainable. Separate these responsibilities (let research, for example, be directed wholly by government spending, education by the sensibilities of the populace, their feeling about what is "relevant," interesting, or experientially of value, and the curriculum by the needs of vocational staffing), and you abrogate the disinterested pursuit of truth. It is perfectly possible for government and business to provide on-the-job training in the skills necessary to keep the present system functioning—possible, too, for research to become the specialized vocation of a particular group trained in this way, and for the rest of education to become a kind of leisure-time activity, a sort of debased Adult Evening Education, reduced to the kind of relation that obtains between a local public library and its borrowers. Indeed, between the long-standing compliances of the administrations and faculty, on the one hand, and the recent demands of student power, on the other, this has very nearly come to pass. When the process is complete, the university will cease to exist. To the extent that the word still has application—as Miss Arendt puts it, "all perversions and hypocrisies to the contrary notwithstanding" —it has not come to pass, but there is nothing inevitable in the survival of a word. No system absolutely needs the university; like disinterested truth itself (which is systematic and not a compilation of working facts), the university is dispensable to operative efficiency. The radicals often claim that since universities provide the brains for technocracy, shutting them down hits the system where it hurts. They are wrong.

Miss Arendt would probably accept the distinction made by Daniel Bell between a discipline and a subject matter. The former has to do with a system of intellectual commitment; the latter designates a related class of topics that can be elucidated by a particular discipline. What seems to be happening in many universities is that administrations, in the face of student demand, are acceding to the conversion of the curriculum, as far as the humanities are concerned, from a set of topics raised at least nominally to the level of subject matter, that is, connected by a discipline, to a set of topics per se, unrelated except by virtue of their capacity to generate student excitement and a feeling of contemporaneity. Perhaps out of weakness in their own commitment, faculty have assented to this: courses are got up in "imperialism," "black culture," *et cetera, et cetera,* all with the desiderated relevance but all considered as topics pure and simple. The new curriculum corresponds in its defects to certain tendencies of the old, where courses were offered in "The Post-War American Novel" or "Existentialism and Alienation" because the topics were *au courant,* drew large enrollments, and "turned the students on." In the clamor of argument between new and old, the voice of humane discipline is drowned, and the loss is considerable, because it denies the professor a chance to develop a reasonable theory of society as the university ought to afford it to him: that is, by unifying his debate both with his colleagues and with a changing body of students through the establishment of a curriculum. (I recall a long and heated discussion in my department over the question of an extended reading list from which the student, in concert with an adviser, was to make a coherent selection of books for independent study. Discussion of its intellectual virtues was suspended by the demand of several junior members that the list include a representative selection of African literature. Curious about this, I asked several of them after the meeting what books they had in mind. None of them could name a single work or author. "African literature" meant simply books written by Africans—with the exception of Saint Augustine, who was already on the list but didn't qualify because he had been co-opted by Europe. "What a reflection," Miss Arendt observes of a similar situation, "on the moral and intellectual state of society that much courage [is] required to talk common sense in these matters! Even more frightening is the all too likely prospect that, in about five or ten years, this 'education' in Swahili, African literature, and other non-existent subjects will be interpreted as another trap of the white man to prevent Negroes from acquiring an adequate education.")

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Miss Arendt does not raise these issues quite as I have put them, but they appear to operate in the foreground of her own argument, which leads her to be singularly clear and unblinking about certain matters, obvious enough in their way, that receive little notice from campus radicals:

> To be sure, nothing is more important to the integrity of the universities . . . than a rigorously enforced divorce from war-oriented research and all connected enterprises; but it would be naïve to expect this to change the nature of modern science or hinder the war effort, naïve also to deny that the resulting limitation might well lead to a lowering of university standards.

If the universities are in receipt of an important public trust, they are entitled to government sponsorship, whatever the nature of that government, and the task of radicalism on campus ought to be to *sterilize* government funds (Henry Steele Commager's word), not in Oedipal rage to cut them off. To be sure, a point may be reached where this appears impossible and conscience demands the severing of government association, but it ought to be clearly in view that the result will be an enhanced feeling of moral purity, not a lasting benefit to the university or the outside community. Miss Arendt seems to me right: both modern science and the war effort will go on. (Think how easily the Draper Laboratories accepted their separation from M.I.T.) As for the lowering of standards, a brain-drain down the financial sinkhole, this will not be due to the mendacity of researchers. Like it or not, we must accept that intellectual life in this century has come to depend in an unprecedented degree upon extensive instrumentation and that, when professors have qualms about forsaking government funds, it is not inevitably, as radicals often seem to think, a conscienceless fear that moves them or a "hang-up" on salaries and ego, but instead their abiding concern, associated with conscience, about the fact that their intellectual life is at stake.

The issue has to be figured in terms of priorities, and when the cutoff seems unavoidable on grounds of conscience, it ought not to be the occasion for rejoicing. Heedlessness of priorities, even when calculations taking them into account would recommend the same course of action, Miss Arendt sees as a species of *violence,* which she defines rather oddly at first glance as action, through instrumentalities, that recognizes no responsibilities toward those to whom it is directed and creates none among those who exercise it, even when they act together. The bit about instrumentalities (used not merely of physical tools but in the sense that legal documents are also instruments) comes in because she wishes to distinguish violence from the exercise of *strength,* which is an individual phenomenon, although it may prove itself against other people; the point here is that violence presupposes a human community but disregards it. Its opposite is *power,* which Miss Arendt speaks of in this way:

> Power corresponds to the human ability not just to act but to act in concert. Power is never the property of an individual; it belongs to a group and remains in existence only so long as the group keeps together. When we say of somebody that he is "in power" we actually refer to his being empowered by a certain number of people to act in their name. The moment the group, from which the power originated to begin with (*potestas in populo,* without a people or a group there is no power), disappears, "his power" also vanishes.

She adds: "In current usage, when we speak of a 'powerful man' or a 'powerful personality,' we already use the word 'power' metaphorically; what we refer to without metaphor is 'strength.' " This addition is rather abrupt, as if a mathematician, after defining *set* to his own purposes, were to insist that its use among tennis players was by way of metaphor. Miss Arendt here is engaged in a characteristic activity, drawing distinctions as her instincts for system-making prompt, and commandeering ordinary language to serve her, a procedure that incurs the disdain of "ordinary language" philosophers, as she well knows.

What she is about becomes clearer on ensuing pages. Power issues from a group's consensus upon the distribution of responsibilities; thus no government can exist, what-

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ever violence it must employ, without a base in consensus, at the very least, among a secret police and its net of informers: in proportion as those governed are not part of the consensus, the government must resort to violence to maintain dominion. It follows from these distinctions that violence, as something inherently disdainful of consensus, makes no appeal to legitimacy. When it requires cohorts and is not merely an individual affair, what it seeks is justification; and although this may often be found, it becomes progressively implausible as the proposed end of violence is not an immediate consequence but distant from the violent act. The reason is, as Miss Arendt maintains (in opposition to contemporary "thinkers of the unthinkable"), that events can never be reliably predicted in human affairs, thanks to man's faculty of action, his capacity for beginning something new. "It is the function," she writes, ". . . of all action, as distinguished from mere behavior, to interrupt what otherwise would have proceeded automatically and therefore predictably." For her, politics is a matter for disciplined thought, but it is not a matter for science, and the pretense otherwise is exactly a mark of that scientism in human affairs that she, like Noam Chomsky in his way, would discredit.

> The very fact that those engaged in the perfection of the means of destruction have finally reached a level of technical development where their aim, namely, warfare, is on the point of disappearing altogether by virtue of the means at its disposal is like an ironical reminder of this all-pervading unpredictability, which we encounter the moment we approach the realm of violence.

Thus Miss Arendt's definitions focus a range of distinctions and observations, which, to the extent that they clarify the tradition of political thought and make for pertinence of contemporary understanding (in this case, elucidating with reference to RAND-think the age-old maxim that when men resort to violence, means tend to overrun ends), justify her insistence that the departure of ordinary language from her proposed usages is by way of metaphor.

The overriding concern of *On Violence* is with tendencies in modern thought to see violence not merely as the occasional resource of justice but as its very origin. She has in mind certain sayings of Chairman Mao—for example, that power grows out of the barrel of a gun—which, as she understands them, confuse power and violence. (Her answering riposte: "Violence can always destroy power; out of the barrel of a gun grows the most effective command, resulting in the most instant and perfect obedience. What can never grow out of it is power.") Further, there are the arguments of Frantz Fanon, who speaks of the practice of violence as something that "binds men together as a whole, since each individual forms a violent link in the great chain, a part of the great organism of violence which has surged upward." She deals with the possible support lent to this notion by contemporary "polemologists," like Konrad Lorenz, and identifies Georges Sorel as an influence, but the roots, in her estimation, go pretty far down in the tradition of Western political thinking, touching base in the Judaic conception that the simple relation of command and obedience suffices to identify the essence of law. As readers of *The Human Condition* know, Miss Arendt herself prefers the Greco-Roman tradition, in which the true or "higher" interest that men have in the preservation of the *res publica*, as opposed to the good they can do themselves at any moment, was explicitly given, as Miss Arendt believes it must be, a metaphysical motive and not founded upon the brotherhood of command or obedience. "It was the certainty of death that made men seek immortal fame in deed and word and that prompted them to establish a body politic which was potentially immortal"—that is, capable of preserving memory—and not the momentary fellowship of exhilaration in the exercise of violence.

Be that as it may, the force of Miss Arendt's inquiry does not lie in the demonstration that others than Marxists, who would tend to see power as an instrument of oppression in the hands of a ruling class, have identified or confused power with violence, legitimacy with justification, the

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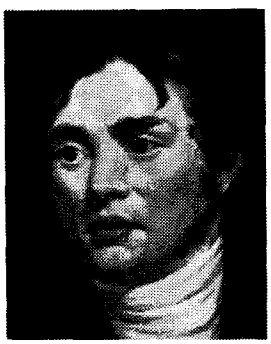

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establishment of consensus with the relation of command and obedience. Rather her inquiry suggests how much violence has always been bred into the Western system of dominion, and therefore how much of what passes as power today is really masked violence.

> Today we ought to add the latest and perhaps most formidable form of such dominion: bureaucracy or the rule of an intricate system of bureaus in which no men, neither one nor the best, neither the few nor the many can be held responsible, and which could be properly called rule by Nobody. (If, in accord with traditional political thought, we identify tyranny as government that is not held to give account of itself, rule by Nobody is clearly the most tyrannical of all, since there is no one left who could even be asked to answer for what is being done. . . .)

This is by now a familiar point, but the distinction between power and violence gives it renewed trenchancy. A salient feature of bureaucracy is the institution of an immense distance between acts of decision-making by individuals within the system and the consequences of these acts. The result is a diminished experience of responsibility. The point, thus, is not that bureaucrats cannot be brought to share responsibility because of some defect of conscience, some personal limitation in their sense of justice, or some curious thwarting of retribution in the system. Indeed, as Miss Arendt sees it, the sense of justice survives as does the ability to exact retribution; what dies is the idea of consensus. Bureaucracy is a form of violence perpetrated by the system as a whole upon its individual members; and since, in Miss Arendt's view, violence drives out power by a kind of Gresham's Law, the triumph of bureaucracy as the dominant form of private and public governance may end by making the sense of justice idiotic. "To expect people, who have not the slightest notion of what the *res publica,* the public thing, is, to behave nonviolently and argue rationally in matters of interest is neither realistic nor reasonable." (It is a hallmark of nonviolent systems that someone may demonstrably sin against his own authority, however absolute his power of office. *King Lear,* for example, cannot be understood without such an assumption, and I must record the melancholy fact that to most of my students the play is on first reading perfectly unintelligible. The debate over the constitutionality of Nixon's actions seems often to skirt—and miss—this point. Just how far we have come along the road to bureaucracy may perhaps be illustrated by a remark of one of my colleagues, a young professor of political science: he did not quite understand all the fuss among Catholics these days, because, as he put it, you could not be a Catholic without believing that the Pope knows best.)

The various conceptual schemes that found power on violence serve both to represent and to apologize for the mixed constitution of reality, in which the two have never existed in watertight compartments. If Miss Arendt is right in her distinctions and her view of bureaucracy, then the confusions between power and violence, legitimacy and justification, as realized in the fact of bureaucracy, are likely to infect the radical cause. This, in her view, is the necessary way to gain perspective on the frequent radical claim that violent action in the name of justice provides the essential basis for a new, spontaneous community, a "conversion experience" that rids us of bureaucratic hang-ups and complicities, of everything issuing from the system that separates us each from the brotherhood of man. Violence needs justification, but men need legitimacy; insofar as the general experience of political life confuses one with the other, the violent resistance to injustice may be readily mistaken for the coping stone of a new communal edifice.

> . . . it is true that the strong fraternal sentiments collective violence engenders have misled many good people into the hope that a new community together with a "new man" will arise out of it. The hope is an illusion for the simple reason that no human relationship is more transitory than this kind of brotherhood, which can be actualized only under conditions of immediate danger to life and limb.

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the American New Left, where overt "trashing" is the prerogative of extreme groups. But Miss Arendt is willing to regard a good deal of the tactics of confrontation politics as a form of violence-entailing risk, and it is this, rather than any programmatic intention, that unites the New Left, insofar as it possesses unity.

She has in mind such things as the foulmouthed rhetoric (meant to show that radicals are not hung-up on sexual and excremental functions, as are their elders) and the so-called nonviolent occupation of buildings and property (meant, among other things, to provoke hostile response and thereby to show up the elders as valuing property more than people). Mindful of the need to resort to violence on certain occasions, and also of the fact that, "contrary to the opinion of one member of Harvard's Board of Trustees, the occupation of a university building by students is not the same thing as the invasion of a branch of the First National City Bank by a street mob, for the simple reason that the students trespass upon a property whose use, to be sure, is subject to rules, but to which they belong and which belongs to them as much as to faculty and administration"—mindful of these things, Miss Arendt does not proscribe the tactics per se, but she recalls the correlative need, in cases of justifiable violence, to be mindful of their violent character. Violence may be necessary for exposing hypocrisy, for unmasking the devious machinery that permits those in power to rule unjustly without recourse to explicitly violent means, but its use should not inspire a countervailing hypocrisy about the nature of the consequences it entails. To the claim that confrontation politics respects the human rights of the adversary, she replies: "Only the opponent's right to life, but none of the other human rights, is actually respected." (One might also be mindful of Stephen Spender's warning that confrontation politics may lead "to doubletalk in which the provocateur is playing at one and the same time the role of assailant and victim.") Miss Arendt is even willing to speak of a human right to property. Throughout her career, she has kept up a running battle with Marxian thought, but the underlying animus here is one that Marx would respect. At every stage of history, according to Marx, one's humanity is realized through a prevailing power-structure and has no existence, except as an abstraction, apart from it; at the present stage of history, to be denied property is to be denied access to one's humanity, except in its bestial aspect, as it can be realized through sheer labor-power. The disjunction "property or people" implied by the radical slogan has thus no application to current society, and to deny a right to property, as the proletariat, for example, was denied it, constitutes an act of violence, as Marx well knew.

Given the nature of contemporary politics, it is likely that the young are necessary to any moral reform on a scale large enough to matter. (They constitute, as Cohn-Bendit says, a permanent leaven of revolutionary ferment.) Miss Arendt, as I said, pays due credit to the inspiration, almost exclusively moral, of the young today. Nonetheless she champions system; and her own makes it plausible that at the moment the best should be full of the wrong sort of passionate intensity. Any defense of system, unhappily, is likely to meet with the charge of scientism from the young radicals, quite as if thought had no option but to choose between being scientific (a good thing in its place but bad in morals or politics) and being undisciplined; in this way the young demonstrate how fully they have been corrupted by the intellectual culture they purport to attack. Miss Arendt is perfectly scathing of scientifically minded braintrusters who ape the surface features of science in attempting to cash in on its considerable prestige; for her part, she does not imagine that scientism in the humane disciplines is the sole alternatve to science itself. She thinks—as she puts it, "an old-fashioned, uncomputerizable activity." Her rebukes have an impersonality because disappointment plays no part in them; her performance gives confidence that to be reasonable is not to be co-opted.

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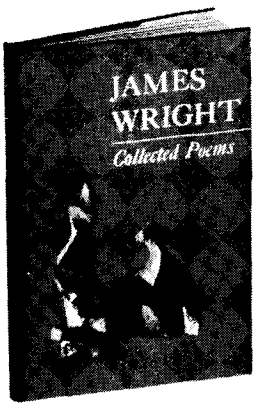

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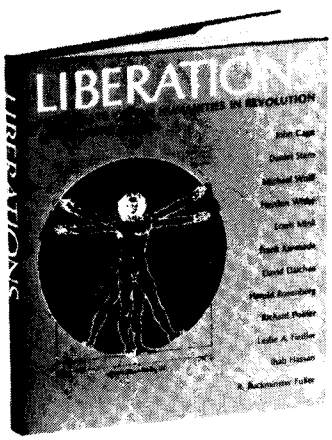

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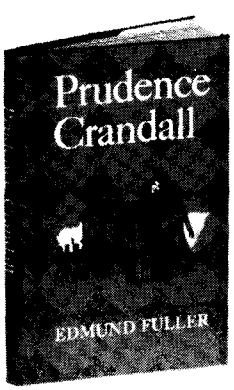

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Toward Distinguishing Reality

THE TIMELY AND THE TIMELESS: The Interrelationships of Science, Education and Society. *By Bentley Glass. Basic Books. $4.95.*

Reviewed by ARNOLD B. GROBMAN

Dr. Glass identifies the problems: ". . . the insanity of military power, the bursting human populations, the exploitation of unrenewable resources, the destruction of the environment by pollution of air, soil, and water, the control of behavior by drugs, and the lengthening of human life span." He observes that "the methods of science constitute the most powerful means yet devised by man for extending his limited senses and for distinguishing reality from hallucination." And he thereby sets the stage for a discussion of science education and the central role it must play if our society is to survive.

In beginning that discussion, Dr. Glass provides an illuminating and concise summary of the activities and history of the highly successful Biological Sciences Curriculum Study, in which he played an active and leading role. In so doing, he gives considerable attention to two complementary aspects of science education, its content and its methods of inquiry and discovery.

He makes several specific observations: It is necessary for the intelligent leadership of the nations of the world to acquire a broader understanding of the interdependence of the natural sciences, social sciences, arts and humanities; curricula must undergo continuous radical revision in part because of the exponential rate in the increase of knowledge, and because an understanding of the nature of scientific inquiry is more important than a mastery of accumulated scientific information. To enable the general citizen to develop an appreciation of the role of science in man's culture and technology, formal education should be extended throughout the life of an individual, while students' schooling should be interrupted for several work periods during adolescence. Because education must prepare persons for changes that are unpredictable, universities should cooperate with local school systems to establish regional education centers designed to prevent working adults' education from becoming obsolete. Further, a periodic renewal of education should be a mandatory and cyclic process for many teachers and other professional persons. Emphasizing these points, Dr. Glass writes, ". . . the educated man of yesterday is the maladjusted, uneducated man of today and the culturally illiterate misfit of tomorrow."

The third chapter in this fascinating small book (which is based on a John Dewey Society Lecture) explores the differences in the science, society and education of 1820 from those of today. From that exploration comes a series of additional observations: the need of a scientist, if he is to be effective, thoroughly to renew, extend and reorganize his education about once in every eight years; the growing resistance to the support of science by a population that has an inadequate understanding of it; increasing opposition to technology because of its identification with the destruction of the environment. In connection with this last point, he suggests that each country have a national agency to study the potential impact of new technologies before permission for their introduction is given.

Dr. Glass's ideas are stimulating and provocative, and they are presented in an engaging and attractive style. While giving no tight formulas for the alterations science education requires, this book contains many clues to the kinds of educational innovations that will be imperative if we are to meet the challenges of the rapidly changing world in which we live. And it is interesting to read.

ARNOLD B. GROBMAN is dean of Rutgers College and professor of zoology. From 1959 to 1965 he was director of the Biological Sciences Curriculum Study that is discussed in this review. He has also served as director of the Florida State Museum and has taught at the University of Rochester and the University of Florida.

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On the Edge of Silence

THE STONE HARP. *By John Haines. Wesleyan University Press. $4.*

THE TATTOOED DESERT. *By Richard Shelton. University of Pittsburgh Press. $2.50.*

DISMANTLING THE SILENCE. *By Charles Simic. Braziller. $3.95.*

DARKER. *By Mark Strand. Atheneum. $2.95.*

Reviewed by LAWRENCE RAAB

For fifteen years John Haines lived as a homesteader in northern Alaska. The poems in his first collection, *Winter News,* drew themselves from this life. They were stark, dreamlike and mysterious, always solitary, often lonely, and possessed by whiteness, which has not only the whiteness of the snow, but the whiteness of speech itself, and, finally, of silence:

> Now, in the white shadow
> of those streets, ghostly newsboys
> make their rounds, delivering
> to the homes of those
> who have died of the frost
> word of the resurrection of Silence.

Haines continues this voice in his second book, *The Stone Harp.* He commands an effortless and almost transparent style. The best poems are like small streams into which the words fall, like stones, gathering color and revealing their markings as water passes over them.

But this book lacks a certain tension and precision. Many of the poems do not speak with the authority that distinguishes *Winter News.* They remain incomplete, as if they had not discovered the real necessity of their being. Particularly weak are the political poems of "America," the book's middle section, which sound as though they had wanted to break into a passion that they could not bear. The landscape here has changed, and moves from Banner Dome to New York to California, where the author now lives. Something is lost in the journey. Haines is at his best when he is in nature, really inside of it, inside the skins of animals and inside their dreams, giving his voice over to their silence. In this new work he is too often at the edge of nature, or looking back at it, as to an abandoned country.

Still, there are lovely poems here, some with an intensity equal to that of anything he has done. These possess an incantatory impersonality. Reading them, one feels that the poet, through the act of the poem, is reaching toward something as basic and as necessary as food or shelter. In one poem Haines speaks of "the mystery of a shared country,/ never completely whole." If many of these new poems are not "completely whole," the best create the likeness of that country, and grow out of its solitude, into the shapes of what we know—wind, water, smoke, stones—the things of the world seen with a clarity that touches their mystery and the possibility of their magic:

> Instead of axe blows and leaves
> falling,
> there is always the sound
> of moonlight breaking,
> of brittle stars ground together.
>
> The talk there is of deadfalls
> and pits armed
> with splinters of glass,
>
> and of how one chooses a stone.

Richard Shelton lives in Tucson, Arizona. He says of his book, *The Tattooed Desert:* "I have lived in the desert for ten years and hope that my work reflects that fact." He calls himself a surrealist, and he may be, although his surrealism is closer to the cluttered, extravagant work of Dali than to the severe mysteries of Magritte.

As with Dali, one tends to remember particular parts rather than a complete vision. The peculiar image, like the quirky sensibility of the limp watch, pretends to be enough in itself. Reading through this book is less like reading a group of individual poems than like reading one long poem that never really begins or ends, or more pre-

LAWRENCE RAAB has completed his first collection of poems, *The Palace at 4 A.M.* His poetry has recently appeared, or will soon appear, in the *Antioch Review,* the *New York Quarterly, Poetry* and *Encounter.* For the past year he has been teaching creative writing at American University.

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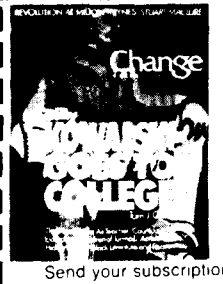

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cisely, like reading a book of single lines, individual sentences, sometimes boring, sometimes fascinating. Before one can become bored, something new happens, but before one becomes entranced, the spell is inevitably broken. Too many of the images seem glib ("Today/walked in the front/door and out the back, going/somewhere important,/while the mountains still waited /to be fed . . ."), too many of the discoveries simply facile language without a true voice ("memory is the only/kind of loss we ever know"). The poems are in such a hurry to upset the order of the world, to make it "surreal," that they never stop to create an image of an alternate world in which distortion might be seen as both mysterious and meaningful.

Yet the book remains interesting, full of an uncontrolled but unmistakable energy. Where a poem will fail to become complete in itself, still a line may stand out, or a sentence, or even a single image or one word that is real and resonant:

> even under torture
> the map refuses to name names
>
> the words we saved
> for an emergency are gone
> leaving us
> with the terrible irony of gestures

The Tattooed Desert is a book of lines, images and gestures in search of a voice to sustain them and a poem to make them whole.

> slowly they raised their heads
> *this is the tattooed desert* they told me
> *all that will survive of it will be*
> *what you remember*

Charles Simic might also be called a "surrealist." Yet, in contrast to Shelton, the displacement of the real in Simic's poetry clearly grows out of the possibilities of the objects themselves, their inner mysteries, their secret revelations. The title of his book, *Dismantling the Silence,* is a clue to the nature of his work. Two earlier collections of his poems (published by Kayak Press, and mostly included in this book) are also instructive in their names: *What the Grass Says* and *Somewhere Among Us a Stone Is Taking Notes.* The grass and the stone are given voices, and the silence, through the naming of it in the poem, can be touched.

These poems are full of the life of silence. But their stillness is not the terrible whiteness of John Haines, not that burden or fear, but something more like an invitation, like a sign from the land itself:

> —And all of a sudden
> In the midst of that silence
> It seems possible
> To live simply
> On the earth.

This silence is like the whiteness of the page upon which the poem begins to take its shape, or like the light of a star arriving from a long distance with a message. ("And the silence is the boat/God has provided/For our long and unknown journey.") Dismantling the silence is a way of putting it back together, inside the words of the poem that moves into silence, learning what the stone knows, and what the grass has to say.

> At night some understand what the grass says.
> The grass knows a word or two.
> It is not much. It repeats the same word
> Again and again, but not too loudly . . .

Richard Howard, in his introduction to this book (which is the first in a Braziller Series of Poetry) calls Charles Simic's voice "a gnomic utterance, convinced in accent, collective in reference, original in impulse," which may be to say that Simic takes as his reference the poetry of primitive, tribal man—poetry that had to *work,* that asked for a change of weather or the healing of a wound, poetry that, properly spoken, might protect a man from his enemy and save him. The impulse is not to explain the facts of one's personal life, but to extend that life out into the secrets of the world. ("The forest is old, older than sleep,/Older than this psalm I'm singing right to the end.") So the poem itself becomes a key and a charm.

And these poems do work, beautifully and strangely, not only for Charles Simic but for us, of the same tribe, in his time and in our shared silence, looking for both the lock and the key that fits.

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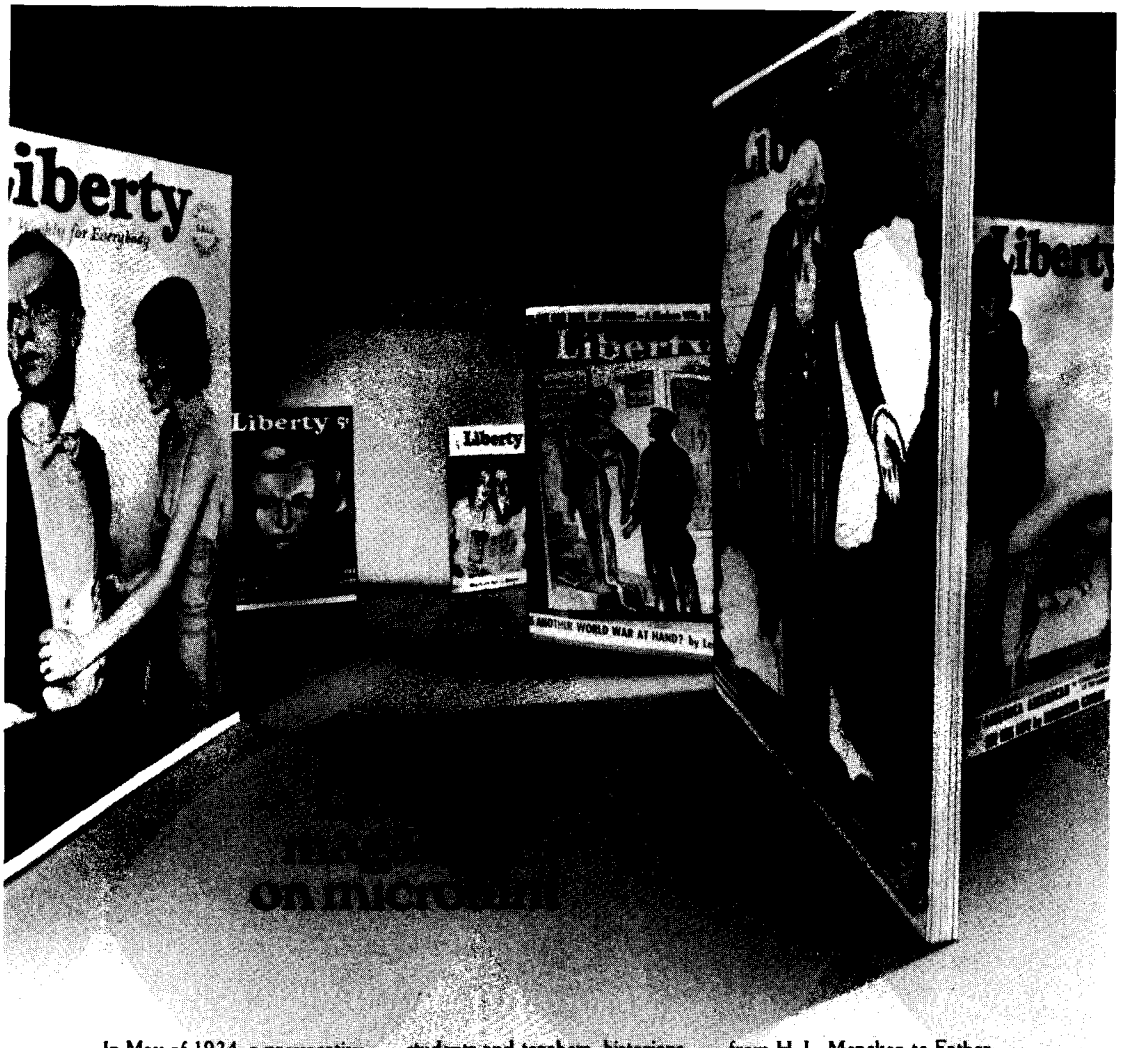

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If it's a poem
You want,
Take a knife;

A star of solitude,
It will rise and set in your hand.

One poem in Mark Strand's marvelous new book, *Darker,* ends: "I grow into my death./My life is small/and getting smaller. The world is green./Nothing is all." Another poem finishes with these lines: "Flowers bloom./Flowers die./More is less./I long for more." More is less and nothing is all. Such "gnomic utterances" might easily become only teasing tricks of language. But Mark Strand has the ability to compose poems in which such lines become statements of discoveries not easily attained, truths that do not congratulate themselves on their knowledge but move on into their own secrets. ("When I talk to the window/I say everything/is everything.")

Strand's poems have the power to gain your immediate trust as a reader. They invite you into the clear, seemingly simple sentences of themselves, and there you feel that the poet's discoveries are also your own, and that his life, transformed into the life of language, attains the difficult discipline of common speech. You can speak these poems almost as if they were your own, as My Life By Somebody Else, which is the title of a poem and of a section of this book.

Why do you never come? Must I have you by being
somebody else? Must I write *My Life* by somebody else?
My Death by somebody else? Are you listening?
Somebody else has arrived. Somebody else is writing.

Near the end of the first poem in this collection, "The New Poetry Handbook," Strand writes:

If a man fears death,
he shall be saved by his poems.

If a man does not fear death,
he may or may not be saved by his poems.

This playful ambiguity is at the heart of this book. The life of a stranger suddenly comes into his hands, and is given away. ". . . It is all I have. I give it all to you." The body is dispossessed of its parts, but at the end the poet is "beginning/again without anything." A poem called "The Remains" concludes: "I empty myself of my life and my life remains." The poems rehearse this process of possession and loss, making and remaking, arriving and departing, as though striving to become the keys to themselves and then, perhaps, to the singular life that has made them, as if they could be the secret, black maps of the present, where you find only yourself, "saying hello/to what you will be . . ."

The presence of Strand's own life and the inevitability of his death are the concern of much of *Darker.* Yet the poems, however haunted, could not be called morbid. This is not a dwelling upon death as finality, but an attempt to discover the particular death that exists within one's own body just as surely as the life that is there.

I was reminded of this passage from Rilke's *The Notebooks of Malte Laurids Brigge:* "They all have had a death of their own. Those men who carried theirs inside their armor, within, like a prisoner. . . . Even the children, and the very little ones at that, did not die just any child's death; they pulled themselves together and died that which they already were, and that which they would have become." And of this section at the book's conclusion: "He thought above all of his childhood, and, the more calmly he reflected, the more unachieved did it seem to him; all its memories had about them the vagueness of premonitions, and their counting as past made them almost future. To take all this once more, and this time really, upon himself—this was the reason he, the estranged, turned home. We do not know whether he remained; we only know that he came back."

Mark Strand's poetry has the authority of such a journey, and the language has a sure voice that can speak clearly across those distances, counting out every word, setting them against the silence, fitting them into the dark.

I have a key
so I open the door and walk in.
It is dark and I walk in.
It is darker and I walk in.

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Quentin Anderson is Professor of English and director of graduate studies in American literature at Columbia University.

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A Biography of Bookmaking

THE ART AND SCIENCE OF BOOK PUBLISHING. *By Herbert S. Bailey, Jr. Harper & Row. $7.95.*

Reviewed by MARK CARROLL

You may recall that Christopher Morley's memorable bookseller, Roger Mifflin, in that classic beloved of bookmen, *Parnassus on Wheels,* exclaims, "Lord, when you sell a man a book you don't sell him just twelve ounces of paper and ink and glue—you sell him a whole new life." Mr. Bailey's excellent treatise, sometimes highly technical, is a guide to the imaginative and intricate procedures that make possible this life-giving process.

The literature of publishing is somewhat thin, since most publishers seem to prefer to talk about their profession (or themselves) rather than to write about it (except in autobiographies). What Mr. Bailey has provided is a cool and objective biography of a modern publishing house, arranged, as he points out in his first chapter, so that the student of the subject can indulge himself in those aspects that interest him most.

The author, who has been in university publishing at Princeton University Press since 1946, and its director since 1954, writes from experience, yet his analysis and observation are by no means limited to university press publishing. I find myself quoting his book often to my colleagues, and I believe that most publishers, of whatever persuasion and in whatever part of the terrain they work, will find it of value. First-book authors who want to know what will happen, and why, to their precious manuscripts, and those who by choice or by chance fall in with publishers, will learn from it also.

Now to content. In brief, the author divides his study into two main parts: The first, dealing with what he calls macro-publishing, charts the environment in which publishers operate, and details the activities that fill their days with fun, profit, and the betterment of man's lot. With helpful diagrams, he shows the artful interrelationships of the publisher with his environment, including those that provide him with manuscripts and are markets for his books. He also anatomizes the interaction (betimes less than perfect) within the publishing house during the process of choosing, packaging (yes) and disseminating the products of man's mind. In his words, "*'Macro-publishing' includes all those aspects which involve the publishing house and its list as a whole.*"

"*'Micro-publishing,'*" he continues, "*includes those considerations that are involved in decisions about an individual book.*" And it is in this part of the book that he brandishes his slide rule and exhibits a fluency in mathematics to show, in some forty pages—complete with figures, graphs and tables—just how to determine the optimum print order for a book. This is the section where science, reinforced by experience and the computer printout that piles up in the accounting department, is appropriately applied to the continuing effort to keep investment and inventory down and the budget balanced. But even in this precise approach, he does not disregard the fabled luck of publishers, for he says, "The careful analysis we have been doing is something like a horse player's analysis of a racing form. One still has to know the horses and the jockeys and sometimes play hunches." The analogy between publishing and the sport of kings is particularly apt.

This is, essentially, a book for managers, building on a knowledge of modern management science, assuming that "the manager of a publishing house is a rational man working with rational people in a rational environment," and yet acknowledging that publishing "is immersed in a sea of irrationality to which it responds and which it stimulates." The blending of science and art in this rational/irrational world is possible, as Mr. Bailey shows with clarity, although I believe it is rare to find the two coexisting within the same head. Despite an increased use of technology and science in

MARK CARROLL is director of the Harvard University Press, secretary of the Association of American Publishers, and a member of the board of directors of the Association of American University Presses.

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publishing, the artful side of the process, setting the style that sets the trend that changes the mind, shall prevail.

And speaking of technology, which he does in a final chapter, Mr. Bailey conjures up an interconnected network of elaborate devices that will transmit books, in some facsimile form, from distant repositories to the user's desk (and/or computer console), or produce, economically and one at a time, on demand, books in the form we have been used to for centuries; but in so doing, he warns us that "we have seen how the great promise of television had led us to a wasteland," and expresses confidence that "with intelligence and planning the new technologies *can* be used to make good books as ubiquitous as television, to our great cultural benefit." That is what selling a whole new life through books is all about, and Mr. Bailey's book helps us to understand, and appreciate, the demands and decisions that form and reform the process.

The Complexities of Nonalignment

YUGOSLAVIA AND THE NONALIGNED WORLD. *By Alvin Z. Rubinstein. Princeton University Press. $11.*

Reviewed by RICHARD NEWELL

Following her excommunication from the community of Communist states in 1948, Yugoslavia was left insecure and isolated by resulting political and economic pressures. To that point, her relations with the non-Communist world had paralleled those of Stalin—which meant viewing Western nations as the enemy camp, and the countries of Asia and Latin America as pawns of that camp. (Africa would not become a concern until the sweep of independence across that continent in the early 1960s.) The break with Moscow was essentially over Stalin's interference in Yugoslav internal affairs. But the ultimate impact would be a

RICHARD NEWELL, an analyst with the Central Intelligence Agency, was a National Institute of Public Affairs Fellow at Harvard University in 1965-66.

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edited by Ibrahim Abu-Lughod
foreword by Arnold J. Toynbee

This volume of sixteen essays is a reexamination of the history and development of Palestine during the mandate period and of the issues underlying the Arab-Israeli conflict. Included are discussions of the relationship of Zionist thought to the emergence of the demand for a Jewish national home in Palestine; the dynamics of land alienation and the demographic transformation of Palestine; the rise and ultimate failure of Palestinian resistance between the world wars; and the role of the Great Powers in the conflict. The contributors include Erskine B. Childers, Richard Cottam, Malcolm H. Kerr, W. T. Mallison, Jr., Ali A. Mazrui, John Ruedy, Richard P. Stevens, and Alan R. Taylor. In his foreword, Arnold J. Toynbee states: *"the presentation is factual. Readers . . . will find in it facts that are well-documented, and these facts are set out by scholars whose first concern is to ascertain and communicate the truth."* $15.00

HUMANISM AND THE ABSURD IN THE MODERN NOVEL

by Naomi Lebowitz

Professor Lebowitz explains and defends the survival of the humanist novel in the present predominantly absurdist atmosphere of modern fiction. As she discusses the humanist novelist's refusal to dissolve the contracts of responsibility between author and character and author and reader, she contrasts the humanist's acceptance of the world's absurdity with the absurdist's attempts to overcome the rift between actuality and aspiration with metaphysical or aesthetic compensations. Humanism, the author claims, has always met the challenge of the absurd; both tempers endure side by side, in fiction as in life. Beginning her study with the literary humanism of Montaigne, she then explores the two attitudes through examination of key novels by George Eliot, Flaubert, Forster, and Dostoevsky and, in a concluding chapter, deals with the presence of these two attitudes in the contemporary novel. $5.50

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significant revision of many ideologically based assumptions and policies in both internal and external matters.

Yugoslavia would accept economic and military assistance from the Western countries as a matter of survival, but without commitment to formal alliances or treaties. Following Stalin's death, relations with the Soviet Union and East European states would be restored. But Belgrade was determined to retain her independence in international affairs, and to regard many of the less developed countries of Asia and later Africa as equally intent on avoiding entanglements with the Great Powers. From this kinship emerged "the nonaligned world," a loose amalgam of less developed countries whose principal restriction was that no "member" could belong to any Great Power military alliance.

Professor Rubinstein traces the Yugoslav transition from suspicion to active cooperation with the nonaligned countries in this substantial analytical study. He details Yugoslavia's concept and pursuit of nonalignment to validate his claim that "Politically, nonalignment ushered in a new era in Yugoslavia's foreign relations. Perhaps more important, for the first time, Yugoslavia had a *national* foreign policy."

President Tito's concept of nonalignment has been that of a dynamic policy aimed at ending bloc politics, democratizing international relations (particularly through United Nations agencies), and aiding the development of the countries of Asia and Africa. While not seeking to establish a bloc of nonaligned states, Tito has demonstrated a determination to lead and educate these states in developing a unity of purpose.

His convictions were summed up in his report to the Yugoslav Federal Assembly in March, 1970, on his eight-nation tour of Africa. The trip was intended to drum up support for a third Conference of Nonaligned States (subsequently scheduled for September, 1970, in Lusaka, Zambia). The Yugoslav leader declared:

> . . . all countries . . . cannot equally feel the weight of all international problems, nor can they hold identical views on all problems. However, in relation to certain great problems—such

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as peace and security, non-interference in the internal affairs of other countries, decolonization, disarmament, assistance to the developing countries, the creation of conditions for economic cooperation on equal terms, a strengthening of the United Nations, the achieving of its universality, and so forth—the nonaligned countries have common interests and mainly identical views.

Tito's personal involvement in seeking unity of action prompts Rubinstein to write, "There is little reason to doubt Tito's crucial role in nonalignment's coming of age. This process was experienced by non-European countries, yet its catalyst was European. That the leader of a small, weak, insufficiently developed country in the Balkans could have an impact far beyond the logic of his power position needs to be mentioned, for whatever importance nonalignment had in the past, holds presently, or aspires to in the future inheres in a central consideration of diplomacy: its human ingredient."

The Yugoslav commitment is extensive. Tito himself has traveled throughout large portions of Asia, Africa and Latin America, and participated in organizing conferences among the nonaligned states. As of 1968, Yugoslavia maintained sixty-five embassies and ninety-nine diplomatic and consular missions. Although a net recipient of credits from the Western nations, Yugoslavia has extended economic and technical assistance to less-developed countries. She has been active in the United Nations and its subordinate organizations, seeking greater influence for the nonaligned in international matters.

The rewards have been considerable. Nonalignment has provided Yugoslavia with a position of influence in international politics far beyond her economic or strategic importance. It brought her out of diplomatic isolation and gave her new friends in Asia and Africa. Expanded influence has increased her bargaining position in dealing with both the United States and the Soviet Union.

Yugoslavia enjoys a leading role among the nonaligned while remaining unique in two respects—as a Communist state and a

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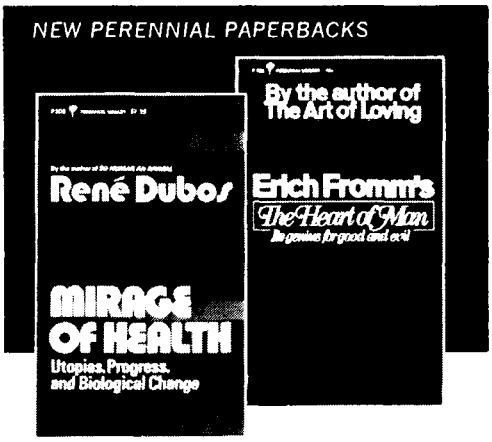

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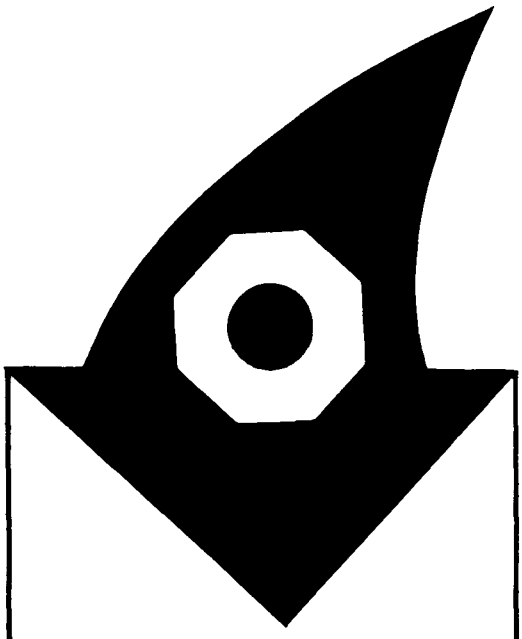

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European state. As relations with Moscow improved, some questioned whether Belgrade might not act as a proxy for the Soviet Union. Others argued that her commitment to Communism would prompt Yugoslavia to try subverting some of her new allies. But Rubinstein concludes:

> . . . after working closely with Yugoslavs for more than a decade, they [the leading nonaligned countries] have made a differentiation which is felicitous to the Yugoslavs: they view them as a breed of Communists quite different from the Soviet or Chinese: and they respect them for their pragmatism, their abstinence from attempts to disseminate their brand of Marxism-Leninism, and their avoidance of interference in the domestic affairs of nonaligned countries. Yugoslavia will not sacrifice its vested interest in its achievements by becoming Moscow's proxy.

Rubinstein does add that Yugoslavia is quite willing to provide guidance to those countries that are attracted to certain aspects of Belgrade's model. The author argues that this model is more relevant to the new nations than that of the Soviet Union or China—"because of its less complex character, its less formally structured mode of operation, and its componential similarities—political, economic, ethnic and religious." I would concur that Yugoslavia has shown both independence and propriety in her dealings with the less developed countries. I am less satisfied with the author's comments on the relevancy of the Yugoslav model. Missing is any real discussion of how the Yugoslav leaders themselves view the relationship of their own experience to the various "national brands of Socialism" prevalent in the nonaligned world. (This relationship is discussed in any detail only in a later—and excellent—chapter on Yugoslav-U.A.R. relations.) Not enough attention is focused on basic differences between Yugoslavia, at the time of implementation of her reforms, and the African and Asian states—such as effective centralized political control in the hands of the Party, a relatively larger skilled labor force, education and literacy levels, and the European setting and influence. Rubinstein might have added that Yugoslavia could learn from

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some nonaligned states in the area of freedom of political expression.

But this is carping about a brief section of what is overall an admirable book. The criticism does introduce the factor of Yugoslavia's European setting. Geography has enabled Yugoslavia to pursue a more global policy than could some of her nonaligned partners. In this regard, Rubinstein distinguishes Tito as an "internationalist" and Nasser as a "regionalist" preoccupied with Pan-Arabism. "Regionalist" could also be applied to other pioneers of nonalignment, including Nkrumah and Sukarno. As the Great Powers came to tacit, if critical, acceptance of nonalignment as a posture, the defensive rationale uniting the nonaligned faded. Instead, regional problems, such as territorial disputes among Indonesia, Malaysia and the Philippines in Asia, and Kenya, Somalia and Ethiopia in Africa, and more recently the Biafra problem and the issue of Cambodian representation at the third Conference of Nonaligned States, have surfaced, to obscure points of unity.

Rubinstein details how basic disagreements over purposes, priorities and procedures have diminished the status and influence of nonalignment as a dynamic force. On critical problems, the nonaligned have been powerless to restrain a Great Power. Only Tito's perseverance has kept nonalignment alive in any organizational form. But that form, notably the periodic conferences, has increasingly served to demonstrate the differences among the participants.

Yugoslavia herself has not escaped compromise in her own commitment to nonalignment. At the first Conference of Nonaligned States, Tito refused to condemn the unilateral breaking of the test ban moratorium by Moscow. Rubinstein is ambivalent in considering the impact of this silence. He writes, "By his equivocation, Tito, the father of nonalignment, dealt his creation, at its moment of maturation, a blow from which it never recovered." But four pages later, he concludes, "That Yugoslavia was host to the first conference of the Heads of State of the nonaligned countries was a stunning triumph and in itself justified Tito's penchant for summitry. The

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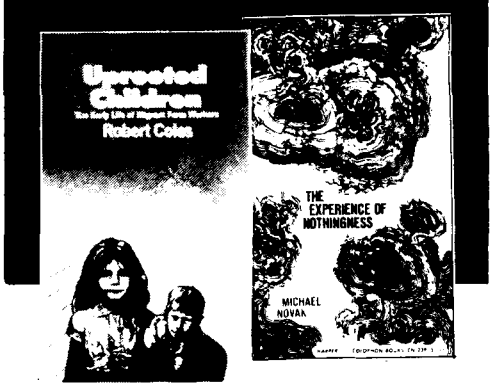

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conference confirmed Yugoslavia's unquestioned credentials as a charter member of the inner council of the nonaligned and Tito's leading role therein."

I would agree that Yugoslavia has not subsequently compromised herself by excusing Soviet actions. Ideological perceptions on matters such as "neocolonialism" and what constitutes "progressive forces" have occasionally resulted in Yugoslav views paralleling those of Moscow. But paradoxically, while Tito's view of an ideal world would be devoid of "capitalists" and "bourgeois elements," he recognizes that the major threat to his independence is from Moscow and not Washington. This threat was underscored by the Soviet invasion of Czechoslovakia in August of 1968, and the "Brezhnev Doctrine" formulated by the Soviet leaders to justify their action. His fundamental commitment to nonalignment has been consistent, and this commitment has been attacked just as consistently by the Soviet leaders.

The future of nonalignment as a dynamic force is not bright. I quoted Tito earlier as noting that "the nonaligned countries have common interests and mainly identical views." But undoubtedly more accurate was the comment of a delegate to the preparatory session in Dar es Salaam for the third conference, who lamented, "There are as many definitions of nonalignment as there are countries in the movement." Tito is now seventy-eight, and his successors may question whether the Yugoslav investment in energy and resources is worthwhile. The costs of travel by her leaders, maintenance of an extensive network of diplomatic missions, and dispensing of economic and technical assistance are a strain on Yugoslavia's modest economic means. The question is not whether Yugoslavia will remain nonaligned, but whether she will continue to work as actively for some organizational unity.

This study is recommended to students of Yugoslav foreign policy and to those interested in the complexities of nonalignment. The clarity of Professor Rubinstein's writing matches the quality of his research and critical observations, and an excellent bibliography is included.

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The Reader Replies

THE READER REPLIES *carries miscellaneous comments by readers and authors on various articles that have appeared in the magazine. All communications should be addressed to: Editor,* THE AMERICAN SCHOLAR, *1811 Q Street, N. W., Washington, D. C. 20009. Because of space limitations we cannot guarantee to print all letters received.*

—EDITOR

I write to commend Estelle and Saul Gilson's superb article, "A Curiosity of History," which appeared in the Spring issue of the SCHOLAR.

As a long-term subscriber to your excellent publication, may I congratulate you and your staff on one of the most literate, engrossing and meaningful magazines in my experience.

DAVID LLOYD KREEGER
Washington, D. C.

* * *

Gerda Lerner's article, "Women's Rights and American Feminism," in the Spring issue renewed my amazement at the Women's Liberation movement.

We women have equal access to education and divorce. We have the advantage over men in many ways. First, a man must work for a living his entire adult life, whether he marries or not. If he chooses bachelorhood he must, in addition to his forty-hour job, cook, wash dishes, launder, clean house, *et cetera.* A woman may choose between a career (plus housekeeping, like the bachelor) or marriage where (depending on her choice of husbands) she may be expected to do nothing but that housework. Men cannot have this leisure. Second, a man, until he is very elderly, must fend for himself. A woman, for no better reason than her sex, will have services such as tire changing and bundle carrying performed for no cost but the bat of an eyelash. Third, parenthood, with all its joys, is nowadays strictly the option of women, married or not. Fourth, in most states, women have the advantage in property settlements in divorce cases.

For all these advantages, are a lower pay scale in some occupations and a smaller number of job opportunities a high price? I think not. In fact, if men really realized how unequal the sexes are—in women's favor—they'd see the need for a Men's Liberation movement.

As to Miss Lerner's discussion of the plight of lower-class women, that is only a part—an indivisible part—of the plight of the lower class as a whole. I see no just way of improving the lot of lower-class women without attempting, regardless of sex, to improve the environment and opportunities of the entire class.

MERRY OVNICK
Northridge, California

MRS. LERNER replies: Mrs. Ovnick misunderstands my article and the basic ideas of the Women's Liberation movement. She assumes a "battle of the sexes" in which one or another side has an "advantage." Those concerned with woman's emancipation are equally concerned with *man's* liberation. We are challenging the traditional assumptions concerning what roles are "proper" for both men and women. We challenge the concept that marriage must mean, for a man, assuming the *sole* burden of supporting wife and children, while it must mean, for a woman, assuming the *sole* burden of housework and child care. We recognize that solutions will vary for individuals of both sexes, but the point is that individual solutions are inadequate. Societal solutions can and must be found that will permit individuals of both sexes a freer choice. This is what is meant by building an androgynous society, in which sex will not automatically determine status and role.

As for the "services" Mrs. Ovnick holds out as an advantage for women, one might point to the many "services" men take for granted: having their meals prepared, their laundry done, their children cared for, their letters typed, *et cetera.* As one feminist put it: "Certainly, I like men to open doors for me. But if that means earning three to four thousand dollars less a year, I'd rather open my own doors, thank you." Lastly, the abolition of discriminatory divorce and alimony laws (which work to men's disadvantage) is an integral part of feminist demands.

* * *

At a time when light verse has been downgraded by the *New Yorker* and barred from magazine publication generally, the appearance of the neatly witty "Penta-gone" by Elliot Abhau in the Spring issue is both welcome and refreshing.

MELVILLE CANE
New York, New York

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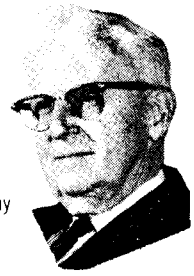

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Professor Muller's article, *"The 'Relevance' of the 'Humanities'"* [AS: Winter, 1970-71], evokes response as well as attention. I therefore presume to present a view or two upon the humanities in our college curriculum. I do so after rather long and varied experience in several institutions of higher learning, as we still like to call them.

All who have served on college faculties during the past decades must know how greatly the world has changed since 1900. Today, wrote the late T. S. Eliot, men live on "ribbon roads," none knowing or caring who his neighbor is but "dashing to and fro in motor cars," familiar with the roadways yet "settled nowhere." When Judgment Day comes we may expect the mind to say: "Here were decent godless people" whose only monument, alas, is "an asphalt road" and "a thousand lost golf balls."

Oldtime methods better suited to different social outlook must give way to others oriented toward the individual who has many distractions of a compelling sort that the teacher may not ignore. We must no longer try to enthuse youth, neither girls nowadays nor boys, with the wonders of *Paradise Lost* in the middle of April when the Mets start their season. "Enoch Arden" and "The Idylls of the King" may better be studied from a newspaper-review approach than in a home devoid of literary atmosphere. . . .

We teachers of the humanities must be more imaginative in our pedagogical approach. Let it be ever remembered that we are trying to stir the spirits as well as minds of our youth in a day when science by its very nature has the edge on us. There is no reason to despair. We are not lost, although not a few of us seem to have floundered because of lack of faith in our glorious subject matter—which to me for one has yielded a goodly group of what I like to call my "unseen friends," men and women in literature, art and history whom I have had the deep pleasure of knowing, if not meeting otherwise. . . .

SAMUEL WHITE PATTERSON, Professor Emeritus
The City University of New York

* * *

. . . I agree with the serious implication of Mr. Da Capo's humorous letter in the Spring issue. He has a good head on his shoulders. Stay elitist. There is nothing wrong with an elite based on merit. 1869? Come now!

C. J. M. MCCARTHY
Baltimore, Maryland

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